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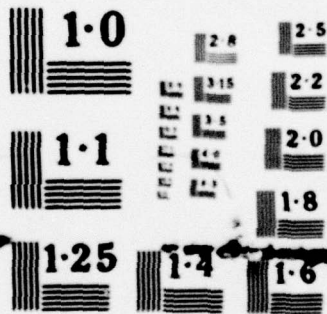
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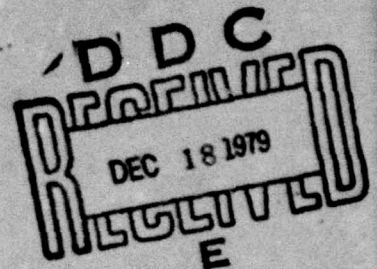
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ASSIGNMENT ELEMENT DIFFICULTY AS A BASIS FOR NURSING PERSONNEL STAFFING AT NAVAL HOSPITALS

Phase I. Project Report

Research Paper 3-79
September 1979

John E. Montgomery
Mary Kelly



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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The purpose of this research is to examine the relationship between the quality of patient care and the difficulty of nursing assignments on patient units at naval hospitals. Phase I of the study has concentrated on adaptation and testing of several research tools for use in quantifying the quality of nursing care and the difficulty of nursing assignments on general medical and surgical units. These tools include a process-oriented quality questionnaire, a patient classification system, a difficulty assessment instrument to be used		

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with the psychological scaling technique of constant-sum paired comparisons, and a work sampling methodology to identify how nursing personnel divide their time among various categories of activities.

The above research tools were used during a 35-day data collection period on three patient units at a single naval hospital. Subsequent data analysis indicates that a demonstrable relationship exists between patient care quality and the average difficulty of patient care assignments and that this relationship has potential as a basis for nursing personnel staffing systems at naval hospitals.

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ASSIGNMENT ELEMENT DIFFICULTY
AS A BASIS FOR NURSING PERSONNEL
STAFFING AT NAVAL HOSPITALS
PHASE I PROJECT REPORT

by

John E. Montgomery
and
Mary Kelly

Research Paper 3-79

Research Department
Naval School of Health Sciences
National Naval Medical Center
Bethesda, Maryland 20014

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Authors

Lieutenant Commander John E. Montgomery, MSC (MHA,MS), USN, is the principal investigator and project director for the study. He is the Assistant Director of the Research Department of the Naval School of Health Sciences, National Naval Medical Center, Bethesda, Maryland.

Captain Mary Kelly, NC (RN, MSN), is the nurse research coordinator for the study. She is a Research Associate at the Naval School of Health Sciences, National Naval Medical Center, Bethesda, Maryland.

Executive Summary

Phase I of the project entitled "Assignment Element Difficulty as a Basis for Nursing Personnel Staffing at Naval Hospitals" has been successful in adapting and testing several research and management information tools which can be used to assess the relationship between the quality of patient care and difficulty of nursing assignments at naval hospitals. These tools are:

1. a patient classification system for general medical/surgical units,
2. a constant-sum methodology for assessing the difficulty of nursing assignments,
3. a Patient Classification Work Sheet for collection of the workload data necessary to assess the difficulty of assignments,
4. a process monitoring instrument for assessing the quality of nursing care on patient units,
5. a work sampling methodology for use on nursing units.

The above tools were used during a 35-day data collection period by staff members and civilian registered nurses who were hired and trained specifically for the study at the Naval Regional Medical Center, Charleston, South Carolina. This provided data for analysis of the relationship between the quality of nursing care and the difficulty of nursing assignments. The analysis revealed statistically significant evidence that relatively high levels of assignment difficulty are associated with relatively low levels of nursing quality. A quadratic least square regression model of the quality/difficulty relationship on two of the three units was

developed and shown to explain approximately 30 percent of the variation in the daily quality index on the units.

Allocation guidelines to reflect real and ideal distributions of workload to RNs, hospital corpsmen and LPNs were developed and used to generate sample staffing requirements for the study units at different levels of average relative assignment difficulty. In so doing, a demonstration was made of how the assignment element difficulty approach might be employed to guide staffing decisions and assist in making trade-offs between the quality of nursing care and the quantity of nursing personnel required.

On the basis of the Phase I study, it is concluded that a demonstrable statistical relationship exists between the quality of nursing care and the difficulty of nursing assignments on the medical/surgical units at the Naval Regional Medical Center, Charleston. It is further concluded that this relationship can be employed to generate quality-related staffing guidelines for those units. If the assumption is made that the relationships between the quality and difficulty found on the study units exists in general at naval hospitals, it may also be concluded that the assignment element difficulty approach to nursing personnel staffing has potential for use in uniform systems for nursing personnel staffing at naval hospitals.

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Introduction

"Assignment element difficulty" is a psychologically-scaled measure of nursing workload which has been shown to be related to the quality of nursing care provided on hospital inpatient units. This quality/difficulty relationship has been exploited as a basis for nurse staffing systems which have been implemented at approximately twenty civilian hospitals in the United States over the past four years [1,2]. The purpose of the research which is reported here is to examine the relationship between assignment element difficulty and the quality of nursing care on patient units at naval hospitals in order to determine the feasibility of developing Navy nursing personnel staffing systems based on assignment element difficulty.

Review of Prior Research

The original research in this area was conducted by Louis E. Freund, at the University of Michigan in the late 1960's [3] and again by Freund and Ingeborg Mauksch at the University of Missouri-Columbia in the early 1970's [4]. The quality/difficulty relationship indicated in the studies is depicted in the graph of Figure 1. The horizontal axis indicates the average relative difficulty of assignments per staff member. The vertical axis is a process-oriented index of the quality of care. The shape of the curve suggests the existence of optimal levels of assignment difficulty with respect to the quality of care provided.

The Quality/Difficulty Relationship

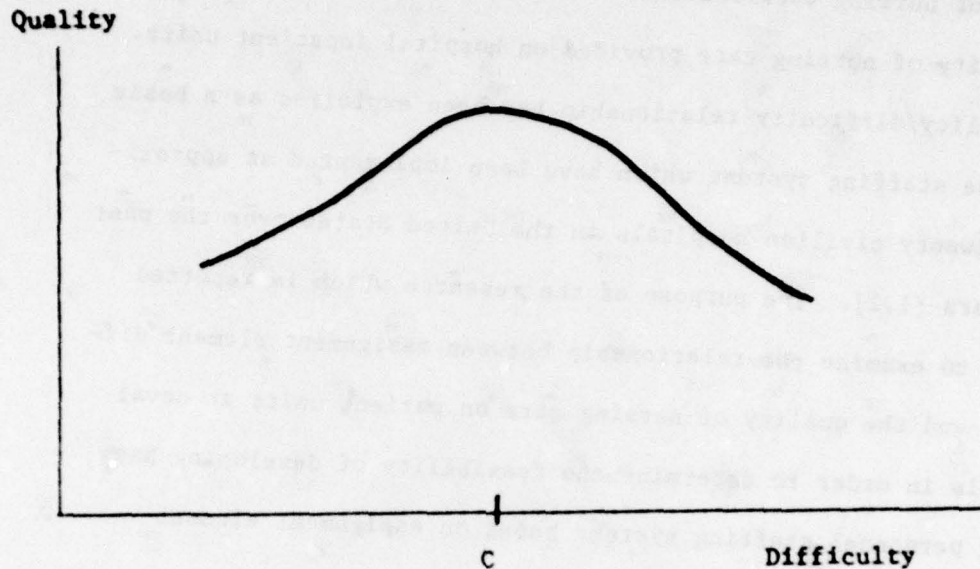


Figure 1

Such an optimal level, depicted as the point C on the graph, is referred to as the "capacity" for difficulty: the average level of difficulty at which members of a given nursing personnel class (RN, LPN, Aide) produce the best quality care.

An important feature of the quality/difficulty relationship depicted in Figure 1 is that it suggests that both under and over utilization of personnel have a negative impact on quality. Thus, a staffing system based on this relationship should be biased neither toward understaffing nor overstaffing.

A second result of the original research by Freund and Mauksch is that a relationship exists between average difficulty of assignments and the percentage of time nursing personnel spend in direct patient care activities. This relationship is depicted in the graph of Figure 2.

Percent Time in Direct Care Versus Difficulty

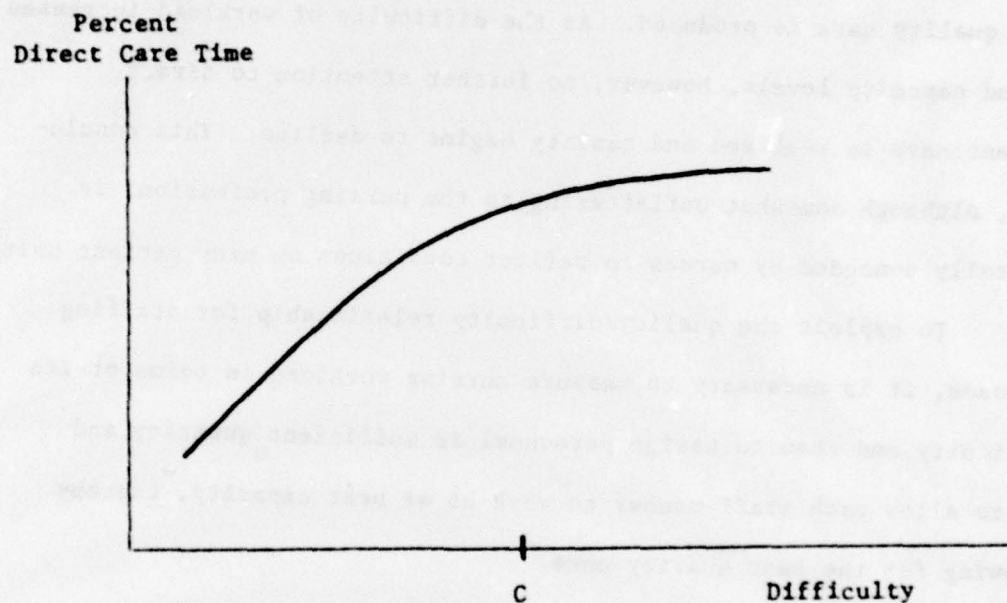


Figure 2

It indicates that as average levels of assignment difficulty increase the percentage of time spent by nursing personnel in direct patient care activities increases also, but at a decreasing rate. This suggests that a point of diminishing returns exists beyond which additional workload requirements result in little, if any, additional direct patient care provided per staff member. As indicated in

Figure 2, this point was found to correspond closely to the capacity level C, beyond which the quality of care begins to decrease.

Taken together, the two major results of the University of Missouri research suggest that in general, nursing personnel do not take advantage of low levels of workload to spend more time with patients or to otherwise produce improved quality of care. It is only as workload begins to demand more attention to patient needs that the best quality care is produced. As the difficulty of workload increases beyond capacity levels, however, no further attention to direct patient care is realized and quality begins to decline. This conclusion, although somewhat unflattering to the nursing profession, is generally conceded by nurses to reflect conditions on many patient units.

To exploit the quality/difficulty relationship for staffing purposes, it is necessary to measure nursing workload in terms of its difficulty and then to assign personnel in sufficient quantity and mix to allow each staff member to work at or near capacity, thereby allowing for the best quality care.

Research Design

The current study, while patterned after the University of Missouri research, differs from it in several details. Because the project, in part, was intended to validate prior research results, substantial differences in the research designs of the two studies will be outlined. The first difference in the current research design is that it focuses on the quality/difficulty relationship on three individual units of a single hospital, whereas the original

study viewed the relationship across a total of twelve units at six different hospitals. Both studies concentrated on medical/surgical units, during the day shift, on weekdays only.

In the current research, as in the original, the difficulty of nursing assignments and the quality of care were monitored simultaneously on each study unit. Work sampling studies were also undertaken to determine the percentage of nursing care time spent in direct patient care activities. While each of these measurement activities involved essentially the same methodologies in both studies, several variations in detail exist which will be discussed as each measurement activity is described in subsequent sections of this report. In the University of Missouri research, data collection occurred over three separate three-week periods. Each hospital was studied during one of these periods, producing a total of 180 unit-days of useable observations. In the current, study data collection occurred on three units for a seven-week period, producing 105 unit-days of observations. Only 71 of these were used in quality/difficulty analysis, however, because of a bias discovered in the quality monitoring activity. This situation will be discussed in a later section of the report.

In the current study, work sampling results were used in two ways. In addition to using them to estimate the percentage of time spent in direct patient care by nursing personnel each day, they were also used to determine the average percentage of time available for patient-centered activities over the course of the study. This latter information was employed to adjust assignment difficulty

measurements to standard eight hour days. Such an adjustment is not apparent in the original study. This procedure will be explained more fully in the next section of the report.

Measuring the Difficulty of Nursing Assignments

Following the methodology of the University of Missouri research, the assignment structure on the three study units was determined through open-ended interviews with a variety of nursing personnel on each unit. It was found that all patient care assignments on the units could be effectively communicated using the activity group descriptions listed in Table 1.

When an activity group is associated with a particular class of patient, it is then called an "assignment element." In the current study, a patient classification system was used which assigned each patient to one of four categories determined by a weighted sum of patient condition indicators. The four classes are described in general terms in Table 2. Details of the patient classification system used in the current study are given in Appendix A.

Given four classes of patients and six activity groups, a total of 24 assignment elements were needed to describe patient care assignments. For practical reasons, related to the way in which difficulty weights for assignment elements were determined, it was decided to refer to both the admission and the discharge assessment using only the heading "assessment." This effectively reduced the number of activity groups to five and the total number of assignment elements to twenty. In the University of Missouri study, five

TABLE 1
ACTIVITY GROUP DESCRIPTIONS

-
-
- PATIENT CARE** - Giving total nursing care to one patient during a particular shift. Need not include medications for that patient.
- MEDICATIONS** - Preparing, administering and charting medications for patients on the unit during a particular shift.
- TEAM LEADING** - Directing, supervising and evaluating all nursing care activities for a specified group of patients on a unit during a particular shift.
- ADMISSIONS** - Settling the newly admitted patient in his room, taking and recording admission vital signs and orientating patient to the unit. May include asking questions and filling in blanks on assessment form. Does not include stamping chart with addressograph, putting forms in order or other clerical admission procedures.
- ASSESSMENT** - Evaluating patient's physical, mental and emotional status and determining nursing care and teaching needs on admission and/or discharge. This does not mean merely filling in the blanks on the assessment form.
-
-

TABLE 2
PATIENT CATEGORY DISCRIPTIONS

-
-
- | | |
|------------------------------|---|
| I. <u>Minimum Care</u> | - Patients in this category require little or no assistance with activities of daily living. They require a minimal amount of nursing care relative to medications, treatments and teaching needs. |
| II. <u>Intermediate Care</u> | - Patients in this category generally require assistance with or supervision of most activities of daily living. They require more than minimal care relative to their medications, treatments, teaching and emotional needs. They do not, however, require frequent skilled care and observation throughout the shift. Their nursing care needs, although significant, are generally intermittent in nature. |
| III. <u>Complete Care</u> | - Patients in this category require frequent skilled nursing care throughout the shift. They require the assistance of nursing personnel to initiate, supervise or mediate the performance of most activities of daily living and may require frequent and complex medications and treatments. They may also require significant amounts of teaching and emotional support. |
| IV. <u>Intensive Care</u> | - Patients in this category require continuous skilled nursing care throughout the shift for the prevention of complications and may be in and out of control. Frequent re-evaluation is necessary so that immediate adjustment of therapy can be undertaken. |
-
-

activity groups and three patient classes were defined, resulting in a total of fifteen assignment elements.

In both the current and the original studies, the method of constant-sum paired-comparisons, described by Torgerson [5], was used to assess the relative difficulty of assignment elements. This psychological scaling technique presents nursing personnel with all possible pairs of assignment elements for judgments of their relative difficulty. These judgments are expressed by dividing a constant sum of 100 points between the members of each pair. An example of such a judgment is displayed in Figure 3.

Medications for 10 intermediate care patients	40
Admissions for 5 minimum care patients	<u>60</u>
	100

Figure 3

The assignment elements are presented with reference to a number of patients, since most of these activities are performed for more than one patient in a typical assignment. The division of points in Figure 3 reflects a judgment that the second assignment element is 50% more difficult than the first. An 80/20 division of points would reflect a four-to-one ratio of difficulty, and so forth. These paired-judgments form the basis for calculating difficulty weights for each assignment element. The constant-sum paired-comparison computational method used in the current study is described in detail in Appendix B. The difficulty weights for the twenty assignment elements used in this study are given in Tables 3 through 5.

TABLE 3

**SINGLE-PATIENT ASSIGNMENT ELEMENT DIFFICULTIES
FOR REGISTERED NURSES**

ACTIVITY GROUP	PATIENT CLASS	UNIT		
		7A	7B	8A
PATIENT CARE	I	.081	.125	.124
	II	.246	.228	.240
	III	.613	.490	.385
	IV	1.625	1.808	1.154
MEDICATIONS	I	.043	.057	.064
	II	.083	.083	.090
	III	.201	.140	.133
	IV	.638	.922	.618
TEAM LEADING	I	.055	.061	.080
	II	.113	.087	.122
	III	.229	.161	.180
	IV	.427	.325	.344
ADMISSIONS	I	.089	.122	.146
	II	.161	.165	.189
	III	.304	.267	.297
	IV	.845	1.115	.892
ASSESSMENT	I	.107	.109	.126
	II	.167	.154	.179
	III	.293	.248	.231
	IV	.945	.963	.710

TABLE 4
SINGLE-PATIENT ASSIGNMENT ELEMENT DIFFICULTIES
FOR HOSPITAL CORPSMEN

ACTIVITY GROUP	PATIENT CLASS	UNIT		
		7A	7B	8A
PATIENT CARE	I	.156	.169	.173
	II	.238	.236	.254
	III	.480	.374	.377
	IV	1.537	1.363	1.164
MEDICATIONS	I	.059	.075	.071
	II	.083	.097	.086
	III	.147	.194	.111
	IV	.709	.662	.584
ADMISSIONS	I	.123	.172	.153
	II	.174	.203	.227
	III	.253	.245	.282
	IV	.842	.727	.864

TABLE 5
SINGLE-PATIENT ASSIGNMENT ELEMENT DIFFICULTIES
FOR LICENSED PRACTICAL NURSES

ACTIVITY GROUP	PATIENT CLASS	UNIT		
		7A	7B	8A
PATIENT CARE	I	.138	--	.080
	II	.247	--	.289
	III	.603	--	.538
	IV	1.491	--	2.376
MEDICATIONS	I	.053	--	.047
	II	.070	--	.085
	III	.148	--	.133
	IV	.716	--	.785
ADMISSIONS	I	.107	--	.108
	II	.183	--	.199
	III	.300	--	.271
	IV	.920	--	.883

As presented, the weights have been divided by the number of patients for which the assignment elements were defined. They therefore represent single patient weights for the assignment elements. Since the constant-sum paired-comparison method produces a unique scale for each personnel class on each ward, the weights displayed in these tables cannot be used for direct comparisons of the relative difficulty of assignment elements across personnel classes or units.

That is to say, while within a specific personnel class and unit, a difficulty rating of .2 may be considered twice as difficult as a rating of .1, a similar statement of relative difficulty cannot be made if the comparison occurs between two different personnel classes or between different units. This non-comparability of difficulty scales is an important feature of the scaling methodology used in this study and in previous research relating to assignment element difficulty. More attention to the effects of non-comparability will be given in the data analysis section of this report.

Given the weights in Tables 3 through 5, it was possible to calculate the difficulty of patient care assignments for each nursing staff member on each unit during the course of the study. Information for such calculations was provided by the charge nurses on each unit using the Patient Classification Work Sheet displayed in Figure 4. The left-hand columns of this sheet provide space to record the condition indicators which determine a patient's classification for the day. The right-hand columns are used to indicate which activity groups are assigned to which staff members for each patient. In the case of the patient care and medications activity groups, space is

PATIENT CLASSIFICATION WORK SHEET

14

CONDITION INDICATORS	SUBGROUP CODING			CONDITION INDICATORS	SUBGROUP CODING		
	I	II	III		I	II	III
A. ISOLATION	1	2	3	J. SPECIAL MEDICATIONS	27		
B. MOBILITY	4	5	6	K. TREATMENTS	23	24	
C. BATHING	7	8	9	L. SURGERY/SPEC. PROCED.	25	26	
D. FEEDING	10	11	12	M. TUBES	27	28	
E. INCONTINENT	13			N. RESPIRATORY THERAPY	29		
F. SENSORY DEFICITS	14			O. EMOTIONAL NEEDS	30	31	
G. VITAL SIGNS	15	16	17	P. TEACHING NEEDS	32	33	
H. CONFUSED/DISORIENTED	18			Q. ACCOMPANY OFF UNIT	34		
I. IV THERAPY	19	20	21				

PATIENT	APPLICABLE SUBGROUP CODES	POINT TOTAL	CLASS	ACTIVITY GROUPS				
				PT CARE	MEDS	TEAM LONG	ADM	ASSESS
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
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24.								
25.								
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27.								
28.								
29.								
30.								

SUMMARY CLASS I ☐ CLASS II ☐ CLASS III ☐ CLASS IV ☐

Figure 4

provided to indicate changes in assignments which may occur during the day. The Patient Care Work Sheets were analyzed using a specifically written FORTRAN program. Knowing each patient's classification and which activity groups were performed by which personnel for what portion of the day, it was possible to compute the average difficulty of assignments for members of each personnel class on each ward each day. This was done by summing the difficulty weights of all the assignment elements performed by members of a given personnel class involved in those assignments.* Charge nurses and ward managers, as well as their patient care assignments, if any, were excluded from these calculations. Tables 6 through 8 display the average difficulty of assignments by personnel class on each ward over the 35 days of the study.

Monitoring the Quality of Nursing Care

As in the original research, the quality of nursing care given on each study unit each day was assessed using a process-oriented monitoring instrument developed at Rush-Presbyterian/St. Luke's Medical Center in Chicago in conjunction with the Medicus Systems Corporation [6]. The methodology calls for using randomly generated subsets of some 250 questions concerning patient care as the basis for a quality index. Each question can be answered "yes," "no" or "not applicable." Since all questions are designed with the

* See the work sampling section of this report for a description of the method used to determine the effective number of personnel available for patient care each day.

TABLE 6

AVERAGE DIFFICULTY OF ASSIGNMENTS
ON 7A BY PERSONNEL CLASS*

DAY	AVERAGE DIFFICULTY OF ASSIGNMENT			STAFFING*		
	RN	HM	LPN	RN	HM	LPN
1	2.29	1.44	0.00	3.0	4.0	0.0
2	1.81	2.89	0.00	2.8	4.0	0.0
3	2.56	1.29	0.00	4.0	5.0	0.0
4	3.37	1.60	0.00	3.1	4.9	0.0
5	2.03	2.31	0.00	4.0	4.0	0.0
6	1.36	1.16	0.00	4.0	5.0	0.0
7	0.96	1.41	1.41	4.0	3.0	1.0
8	1.86	1.21	0.80	4.0	3.0	1.0
9	2.45	1.30	1.40	3.0	3.0	1.0
10	1.76	1.01	1.28	2.2	3.6	1.0
11	2.76	1.29	2.33	3.0	3.0	1.0
12	2.11	1.10	0.00	3.0	5.0	0.0
13	2.36	1.18	0.93	2.0	3.2	2.0
14	2.17	0.63	1.55	4.0	6.0	2.0
15	1.66	0.63	1.09	4.0	5.0	2.0
16	2.60	1.23	0.00	2.0	5.0	0.0
17	2.91	0.91	0.88	2.0	6.0	1.0
18	2.40	0.82	0.66	2.0	5.9	1.0
19	2.07	0.99	0.98	3.0	6.0	1.0
20	0.83	1.38	1.32	3.0	3.0	1.0
21	2.22	1.85	1.76	3.0	2.9	1.0
22	1.82	1.15	1.76	3.0	4.0	1.0
23	2.14	0.76	0.75	2.0	3.0	2.0
24	1.61	1.22	0.00	4.0	3.0	0.0
25	1.56	1.06	0.49	3.0	2.0	1.0
26	1.93	1.73	0.00	3.0	2.0	0.0
27	2.35	1.02	1.11	4.0	2.0	1.0
28	2.41	1.53	1.46	3.0	4.0	2.0
29	1.58	1.22	0.95	2.6	3.0	2.0
30	1.45	0.93	0.77	4.0	2.8	2.0
31	1.24	0.84	0.00	3.5	4.0	1.0
32	0.87	0.57	0.25	4.0	5.0	1.0
33	1.09	0.51	0.98	3.0	4.0	2.0
34	1.20	0.87	0.98	2.0	4.0	2.0
35	1.50	0.90	1.33	3.0	3.0	2.0

* Charge nurse and ward manager excluded.

TABLE 7
AVERAGE DIFFICULTY OF ASSIGNMENTS
ON 7B BY PERSONNEL CLASS*

DAY	AVERAGE DIFFICULTY OF ASSIGNMENT		STAFFING*	
	RN	HM	RN	HM
1	1.77	1.38	2.4	3.0
2	1.43	1.33	3.0	2.0
3	1.16	1.30	4.0	1.0
4	1.74	1.14	3.0	3.0
+ 5	-	-	-	-
6	1.73	1.70	3.0	3.0
7	1.44	1.30	3.0	5.0
8	1.31	1.27	3.0	4.0
9	1.88	1.13	3.0	3.0
10	0.86	1.50	3.0	2.6
11	1.26	1.01	2.9	3.0
12	1.21	1.22	2.0	3.0
13	1.49	1.26	2.0	3.0
14	1.55	1.48	2.0	2.0
15	1.11	0.80	2.7	2.0
16	1.48	1.25	2.6	2.0
17	1.20	1.15	3.0	1.6
18	0.88	1.05	2.0	3.0
19	1.50	1.66	2.0	2.0
20	1.63	1.34	2.0	2.0
21	2.09	1.21	2.0	2.0
22	1.10	0.99	4.0	1.0
23	1.28	1.28	3.1	1.0
24	1.01	1.23	3.0	2.0
25	0.93	0.55	3.3	3.0
26	1.25	1.12	2.6	3.0
27	0.77	1.13	3.7	3.0
28	1.34	1.41	4.0	2.0
29	1.57	1.04	3.0	1.0
30	1.31	1.21	2.0	2.5
31	1.54	1.12	3.0	2.0
32	1.40	0.87	2.0	5.0
33	1.70	0.72	3.0	5.0
34	1.88	1.19	2.0	2.8
35	0.82	1.49	2.0	2.8

* Charge nurse and ward manager excluded.

+ Missing data.

TABLE 8
AVERAGE DIFFICULTY OF ASSIGNMENTS
ON 8A BY PERSONNEL CLASS*

DAY	AVERAGE DIFFICULTY OF ASSIGNMENT			STAFFING*		
	RN	HM	LPN	RN	HM	LPN
1	1.76	1.02	0.79	3.1	5.1	2.1
2	1.66	0.67	1.32	4.0	6.0	1.0
3	1.53	0.87	0.67	4.0	3.0	3.0
4	1.95	0.95	0.87	4.0	3.0	3.0
5	1.49	0.94	0.58	4.0	3.0	2.0
6	1.53	0.81	1.07	4.0	3.0	2.0
7	0.98	0.90	0.65	4.0	2.0	3.2
8	0.97	1.81	0.33	5.0	2.0	4.0
9	1.97	0.78	0.69	4.0	1.0	3.0
10	2.23	1.02	1.18	3.0	1.0	2.5
11	1.49	1.20	0.42	4.0	4.0	2.0
12	1.65	1.28	0.45	4.0	4.0	2.0
13	1.94	0.93	1.25	4.0	4.0	3.0
14	1.66	1.01	1.12	4.0	4.0	2.0
15	1.64	0.61	0.97	4.0	3.0	2.0
16	1.76	1.20	1.36	4.0	3.0	1.0
17	1.70	1.00	0.68	3.0	4.8	2.0
18	2.53	0.66	1.01	3.3	6.0	2.0
19	2.41	0.96	0.50	3.0	4.0	2.0
20	1.97	1.24	1.53	4.0	3.0	1.0
21	1.59	0.93	0.00	3.0	6.0	0.0
22	2.61	0.77	0.42	2.0	6.0	1.0
23	1.41	1.07	0.00	4.0	6.0	0.0
24	2.68	0.96	1.24	2.6	4.0	1.0
25	2.20	1.11	1.05	2.0	3.9	1.0
26	1.24	0.94	0.95	3.6	2.0	1.0
27	1.15	0.93	0.41	3.0	0.6	2.0
28	1.83	0.71	0.24	3.0	2.0	1.0
29	1.75	0.50	0.68	3.0	3.0	1.0
30	1.67	0.83	0.00	2.0	3.9	0.0
31	3.05	1.30	1.29	2.0	3.0	1.0
32	1.55	0.63	0.40	3.0	4.4	1.0
33	1.87	1.01	0.00	3.0	4.9	0.0
34	1.96	0.88	0.46	3.0	5.0	2.0
35	1.64	0.61	1.21	3.6	4.0	2.0

*Charge nurse and ward manager excluded.

answer "yes" being a positive quality indicator, the resulting index, in its simplest form, is computed as the ratio of the number of yeses divided by the total number of applicable questions. It is also possible to develop a weighted index, but this was not attempted in either the current or previous studies. The quality questionnaires were administered by specifically hired and trained registered nurses. Questions were answered from a variety of sources: patient interviews, staff interviews, record reviews and direct observations.

The quality of care index for each unit each day was determined by assessing the quality of care provided to six randomly selected patients on the unit. While a total of approximately 400 questions were asked in each such daily unit assessment, only those which were considered to be indicative of the quality of care delivered on the particular shift being studied were used in the analysis. A complete list of these shift-specific questions is given in Appendix C. The same general procedure was followed in the University of Missouri research, however, the subset of questions considered to be indicative of the daily quality of care was not identical.

In the current study, panels of nurses at the study hospital and at the National Naval Medical Center, Bethesda, Maryland, determined the exact wording of the questions and selected those questions which would form the basis of the daily quality index. Some questions on the original Rush-Medicus questionnaire were deleted, a few were slightly modified and one question was added.

The quality monitors rotated among the study units, so that each unit was monitored by a different person each day. The monitors were trained, tested and found to be consistent in their use of the quality monitoring instrument prior to the start of the study. During the 35-day data collection period, however, one monitor consistently produced quality indices which were significantly lower than the other two. It was subsequently decided to delete all observations made by this monitor from the data analysis. All usable quality index data is displayed in Table 9.

Work Sampling

Work sampling during the course of the study had two purposes. First, it served to estimate the effective number of personnel available for patient care each day. Second, it was used to determine the percentage of time spent in direct patient care for each personnel class each day.

The work sampling design followed that recommended by the HEW Division of Nursing [7]. Specifically hired and trained registered nurses made instantaneous observations of nursing personnel activities at a rate of six observations per hour. The data collection sheet is displayed in Figure 5. It was used by the observers to record their observations in brief descriptive terms. Code numbers were then applied to these descriptions. The activity codes were analyzed to estimate the percentage of nursing care time spent in various activities by personnel type. Separate analyses were performed for charge nurses and ward managers. The activity codes used are displayed

TABLE 9
DAILY QUALITY INDICES BY UNIT

DAY	UNIT		8A
	7A	7B	
1	*--	78	79
2	76	81	--
3	78	--	77
4	--	74	82
5	73	76	--
6	81	--	78
7	--	80	80
8	77	81	--
9	82	--	82
10	--	80	78
11	76	81	78
12	79	78	78
13	--	80	72
14	79	77	--
15	80	--	77
16	--	78	80
17	75	83	--
18	82	--	79
19	--	76	83
20	81	78	--
21	74	--	75
22	--	82	82
23	82	77	--
24	76	--	79
25	--	79	75
26	77	79	--
27	99	--	79
28	--	78	81
29	80	76	--
30	81	--	83
31	--	78	79
32	79	80	--
33	81	--	81
34	--	82	77
35	78	82	--

* Dashes indicate inconsistent quality results considered to be missing data.

in Table 10 and the results of the work sampling by major activity heading are given in Table 11.

To determine the effective number of personnel available for patient care on each unit each day, the number of personnel of each category present was multiplied by the average proportion of time available for patient care for that category during the entire study. This proportion was defined as the average proportion of time spent in patient-centered activities plus the proportion of time spent in personal activities minus .13. The .13 figure was subtracted to allow for 13 percent personal time each day for lunch and breaks. Table 12 gives the effective patient care proportions by unit and personnel class.

Direct care time was defined simply as the sum of activity codes 11 and 12 for each personnel class. Table 13 displays the percentage of time spent in direct care activities.

During the data collection period the coding of all work sampling observations was checked each day for consistency with the activity descriptions by the research nurse coordinator.

Data Analysis by Unit

All data collected in the course of the study was coded for computer use and entered into several data files at the Naval Medical Data Services Center, Bethesda, Maryland. Initial analysis efforts were directed at obtaining plots of the relationship between the quality of nursing care and the average difficulty of assignments on each unit.

(35)

TABLE 10
ACTIVITY CODES

MAJOR CODE	SUBGROUP CODE	TYPE OF ACTIVITY
1		Patient Centered
	11	Giving care
	12	Other procedures, direct
	13	Exchange of information
	14	Indirect care
2		Personnel Centered
	21	Professional development
	22	Personnel, other
3		Unit Centered
	31	Environment
	32	Supplies and equipment
	33	Other unit activities
	34	Research
	35	Military
4		Other Centered
	41	Personal
	42	Delay

TABLE 11

WORK SAMPLING RESULTS BY
UNIT AND PERSONNEL CLASS

PERCENT DISTRIBUTION OF TIME

UNIT	PERSONNEL CLASS*	PATIENT CENTERED	PERSONNEL CENTERED	UNIT CENTERED	PERSONAL CENTERED
7A	RN	65	7	14	14
	HM	55	7	22	16
	LPN	67	3	16	14
7B	RN	55	4	22	18
	HM	51	5	26	17
8A	RN	65	5	15	15
	HM	56	4	24	16
	LPN	59	2	20	19

*Charge nurse and ward manager excluded.

TABLE 12
EFFECTIVE PATIENT CARE PROPORTIONS

UNIT	PERSONNEL CLASS*	PROPORTION OF TIME AVAILABLE FOR PATIENT CARE
7A	RN	.68
	HM	.58
	LPN	.69
7B	RN	.62
	HM	.56
8A	RN	.68
	HM	.59
	LPN	.65

* Charge nurse and ward manager excluded.

TABLE 13

PERCENTAGE OF TIME DEVOTED TO DIRECT PATIENT CARE
BY PERSONNEL CLASS AND UNIT

DAY	UNIT	7A			7B		8A		
	PERSONNEL CLASS*	RN	HM	LPN	RN	HM	RN	HM	LPN
1		38	43	-	37	48	22	29	29
2		36	41	-	35	29	23	18	24
3		40	42	-	19	29	20	27	19
4		29	49	-	36	54	19	32	36
5		30	46	-	30	33	24	40	38
6		41	45	-	39	34	22	41	34
7		33	40	52	29	38	27	37	24
8		28	34	35	28	41	20	42	16
9		29	34	23	25	39	31	34	21
10		37	39	46	23	41	19	26	40
11		31	47	59	31	39	24	35	32
12		37	42	-	24	46	28	27	41
13		39	38	40	46	42	23	30	39
14		23	28	46	41	47	24	35	39
15		27	24	43	27	41	21	31	52
16		20	34	-	23	37	26	36	41
17		24	34	36	27	38	22	32	34
18		12	35	49	32	34	27	38	36
19		24	29	50	25	17	25	35	35
20		23	46	31	28	14	22	44	58
21		51	47	54	21	38	14	25	-
22		35	45	54	23	38	25	30	38
23		23	38	36	28	38	22	29	-
24		29	50	0	27	35	20	32	38
25		21	39	37	21	14	37	32	44
26		47	42	-	15	41	26	25	28
27		42	30	43	21	37	20	41	35
28		33	25	50	18	38	25	33	36
29		21	19	40	30	29	15	35	44
30		23	19	35	30	33	22	29	-
31		22	23	39	28	35	36	34	29
32		19	26	30	29	26	29	31	27
33		24	22	36	19	30	29	34	-
34		19	28	38	28	24	30	28	25
35		33	38	53	16	27	27	39	23

* Charge nurse and ward manager excluded.

The quality of nursing care, being a result of the combined effort of the entire nursing staff on the unit, can be directly displayed as a one dimensional quantity. If the difficulty of assignments could also be directly displayed as a single variable, developing a two dimensional plot of the relationship between quality and difficulty would be a simple task. However, because the difficulty of assignments is measured on different scales for each class of personnel, some way of normalizing these separate scales to each other is necessary.

In the University of Missouri research, in preliminary data analysis, the scale differences of the personnel classes were ignored. Difficulty was collapsed to a one dimensional quantity using a simple average of assignment difficulty across personnel classes. This can be expressed as:

$$AD = \left[D_{RN} + D_{LPN} + D_A \right]^{1/3}$$

where

AD = overall average difficulty of assignments

D_{RN} = average difficulty of assignments for registered nurses

D_{LPN} = average difficulty of assignments for licensed practical nurses

D_A = average difficulty of assignments for nursing aides.

In later analysis, the difficulty scales were normalized to each other via the capacity for difficulty of each personnel class, that is, the level of difficulty for each personnel class at which the

best quality care was produced. This produced a one dimensional measure of difficulty known as the average relative difficulty.

It may be expressed as:

$$ARD = \left[\frac{D_{RN}}{C_{RN}} + \frac{D_{LPN}}{C_{LPN}} + \frac{D_A}{C_A} \right]^{1/3}$$

where

ARD = average relative difficulty

C_{RN} = capacity for difficulty of registered nurses on the unit

C_{LPN} = capacity for difficulty of licensed practical nurses on the unit

C_A = capacity for difficulty of nursing aides on the unit.

The capacities for difficulty used in conjunction with the above formula in the University of Missouri research were determined by a trial and error method which sought a combination of personnel capacities that produced a quality/difficulty curve peaking at 1.0 units of average relative difficulty and also reflecting minimal decreases in the quality of care at low levels of difficulty [2].

In the current research, the one dimensional measure of assignment difficulty on a unit is taken as the weighted average relative difficulty of assignments. This may be expressed as:

$$WARD = \left(\frac{N_{RN} D_{RN}}{A_{RN}} + \frac{N_{HM} D_{HM}}{A_{HM}} + \frac{N_{LPN} D_{LPN}}{A_{LPN}} \right) \left(\frac{1}{N_{RN} + N_{HM} + N_{LPN}} \right)$$

where

WARD = weighted average relative difficulty

N_{RN} = effective number of registered nurses available for patient care on the unit

N_{HM} = effective number of hospital corpsmen available for patient care on the unit

N_{LPN} = effective number of licensed practical nurses available for patient care on the unit

A_{RN} = average difficulty of assignments for registered nurses on the unit over the entire course of the study

A_{HM} = average difficulty of assignments for hospital corpsmen on the unit over the entire course of the study

A_{LPN} = average difficulty of assignments for licensed practical nurses on the unit over the entire course of the study.

This measure is very similar to the average relative difficulty measure used in the University of Missouri research, if we assume that, on the average, personnel work at or near their capacity. Even without this assumption it provides a reasonable way of normalizing the difficulty scales to each other because it allows a statement to be made concerning how difficult assignments on the unit are on a particular day relative to how difficult they are on the average. The weighting by the effective number of personnel of each type available for patient care on the unit guards against a disproportionate weighting of the difficulty measure by a single personnel class. For example, on a day when a single LPN is assigned to a unit with four RNs and five corpsmen, the contribution of her assignment difficulty to the average difficulty would appropriately be one-tenth

using the WARD measure, whereas it would be counted at the disproportionate rate of one-third if the ARD measure were used. The WARD measure assures proper proportionate representation of each personnel class in the overall difficulty measure.

Using the WARD measure, plots of the quality/difficulty relationship were made for each unit. These are displayed in Figures 6, 7, and 8. The triangles superimposed on the plots represent the average level of the quality index aggregated over intervals of the WARD measure. The curves superimposed on the figures represent the best least squares fit of a quadratic mathematical model of the quality/difficulty relationship. The model in question is of the form:

$$Q = b_0 + b_1 \text{WARD} + b_2 \text{WARD}^2$$

This model was chosen because of the shape of the quality/difficulty relationships found in the University of Missouri research. While none of the unit level plots or regression analyses indicate a particularly strong relationship between the quality of patient care and the difficulty of assignments, the results of the 7A and 7B analyses are statistically significant at the $\alpha = .01$ level for 7A and at the $\alpha = .10$ level for 7B. The R^2 values for the 7A and 7B regression models are .45 and .22 respectively, indicating that the model explains 45% of the variation of the quality index on 7A and 22% on 7B. The 8A plots and regression results are statistically insignificant.

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Quality Versus Difficulty

Unit 7A

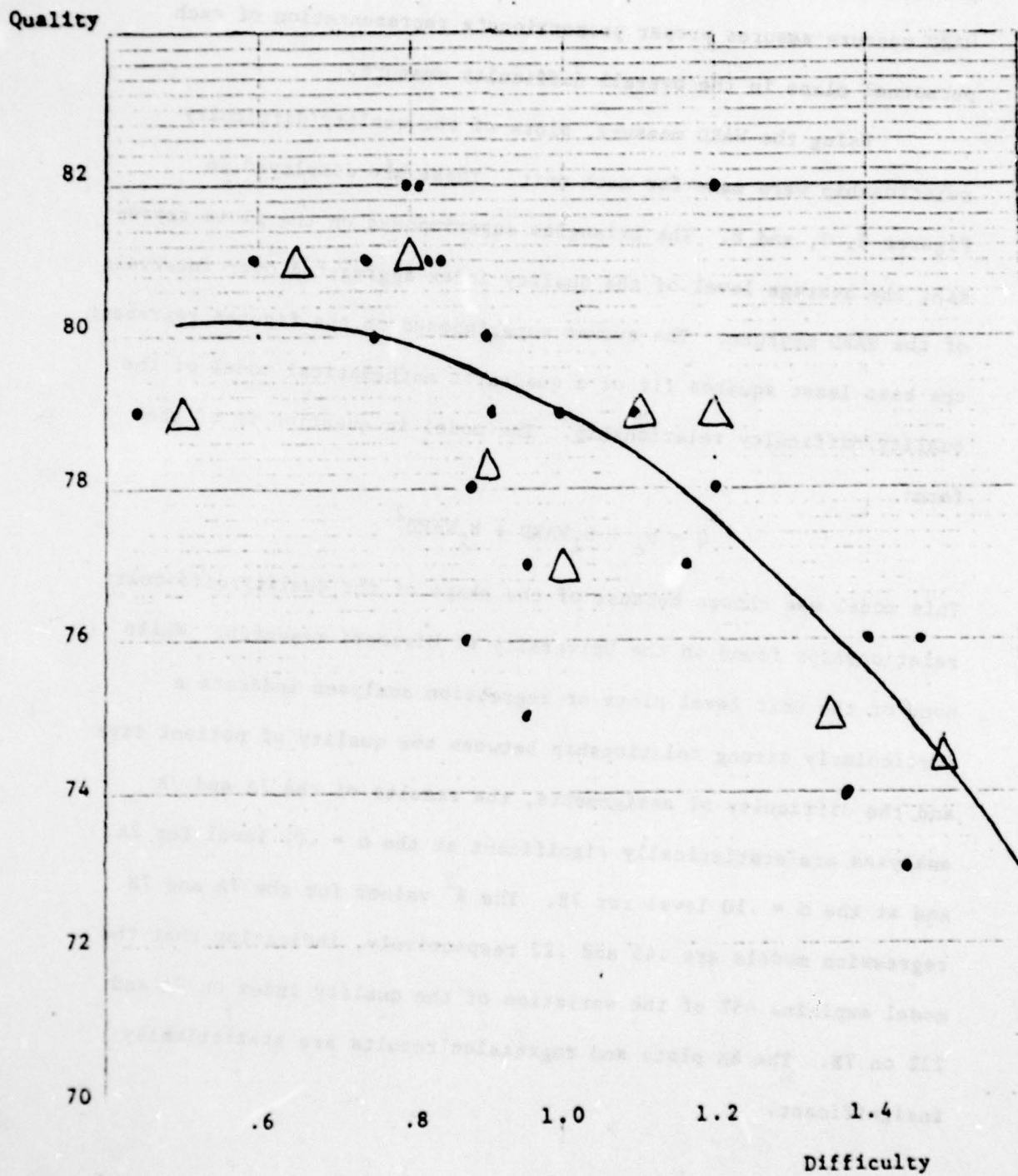


Figure 6

Quality Versus Difficulty

Unit 7B

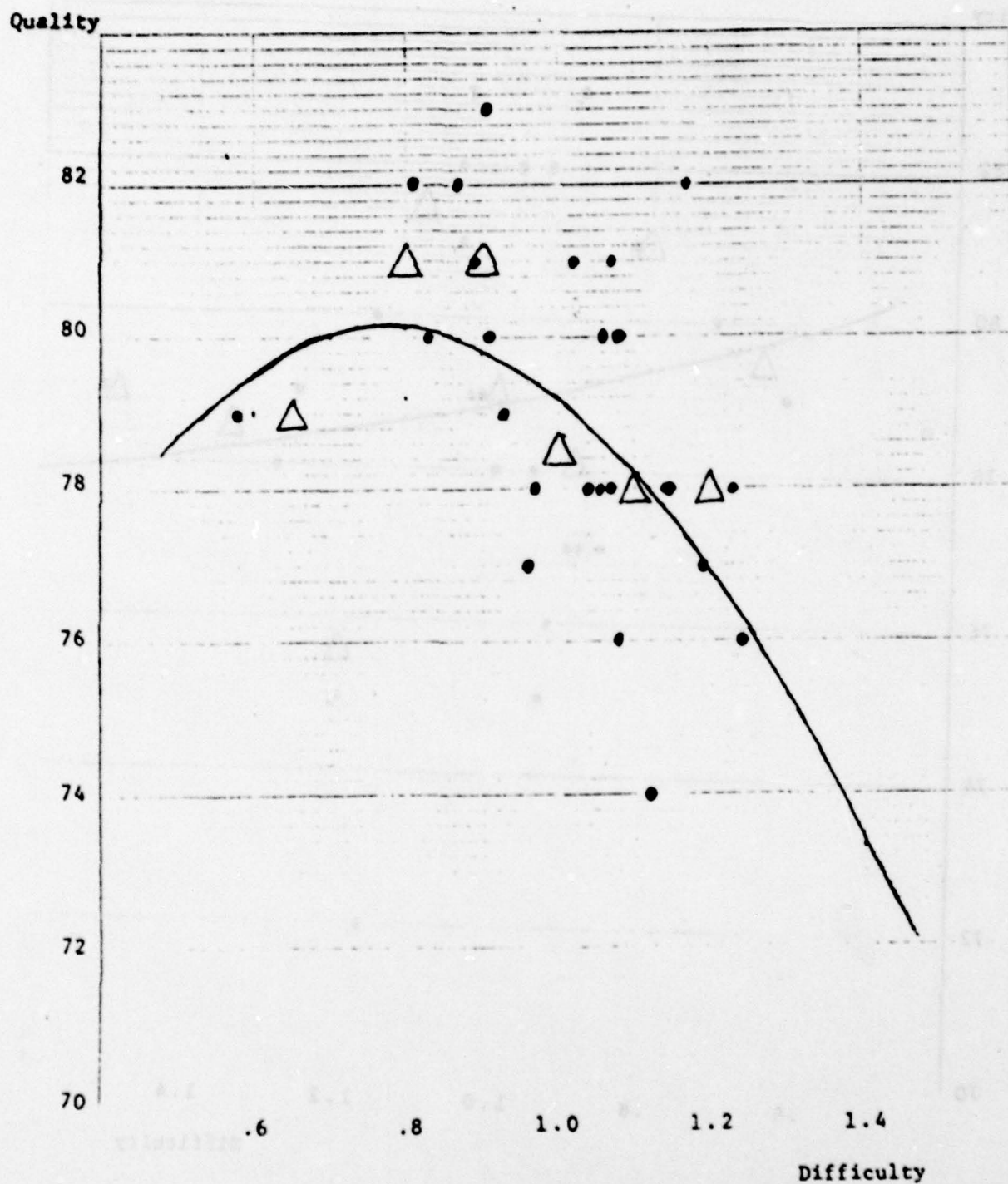


Figure 7

Quality Versus Difficulty

Unit 8A

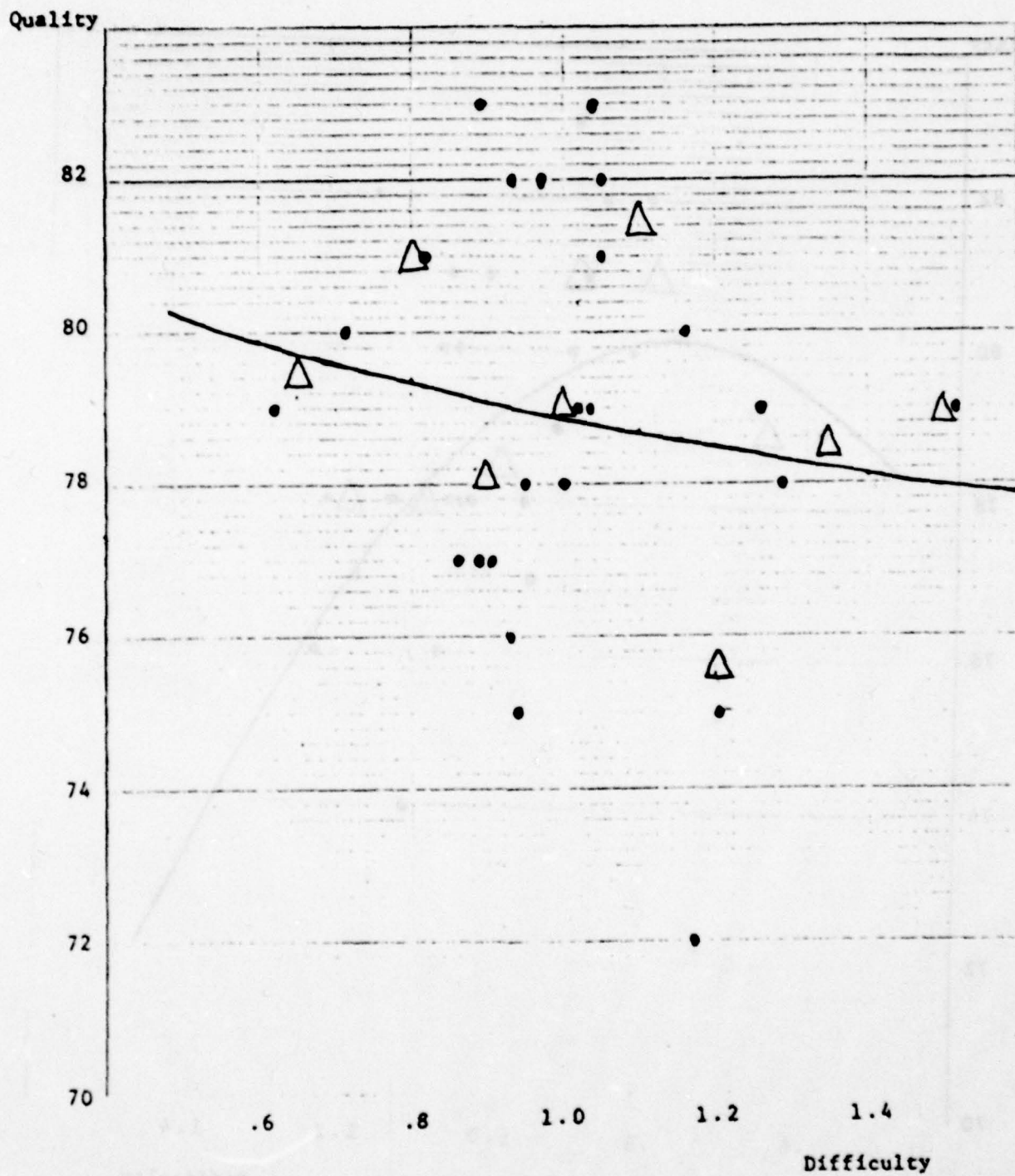


Figure 8

The generally weak performance of the models on the unit-level must be viewed against the backdrop of the unit-level results in the University of Missouri research. Unit-level results were not reported, but from conversations with the principal investigator for that study it is known that no strong relationships between quality and difficulty at the unit level were found. In this context, the fact that the unit level results reported here indicate a statistically significant relationship between quality and difficulty on two of the three units studied is, perhaps, practically significant, even though the relationship is weak and differs somewhat from that found in the University of Missouri research across units.

Two possible explanations for the non-relationship found on 8A suggest themselves. First, 8A was the only unit which was significantly impacted by nursing students during the course of the study. An attempt was made to adjust for this in the data collection by identifying patient care assignments involving students and eliminating them from the study, but it is not known what real impact the presence of the students had on the assessment of difficulty or on quality. Secondly, during the course of the study, the charge nurse on 8A was called to a supervisory position, leaving her responsibilities for the unit's management to a series of temporary replacements. This fluctuation in unit leadership may have had an impact on the quality of care provided and masked the quality/difficulty relationship.

The principal difference between the quality/difficulty relationship reported in the University of Missouri research and the relationships found in the current research on 7A and 7B is that the 7A and 7B results do not show a marked decline in the quality index at low levels of difficulty over the relevant range of the data. It must be observed, however, that on both 7A and 7B, the highest quality scores do not occur at the lowest levels of difficulty. It is possible that if more data had been collected at very low difficulty levels a relationship more closely resembling that found by Freund and Mauksch may have emerged. On the other hand, that the data available for analysis here indicates little or no decrease in quality in the lower ranges of difficulty may properly be viewed as an encouraging result. Although it makes the determination of optimal levels of difficulty with respect to quality less straightforward, it suggests that, on the units in question, attention to quality was maintained even under relatively slack conditions, i.e., more discretionary time for these personnel did not result in a lack of attention to patient needs.

The apparent weakness of the quality/difficulty relationship at the unit level has at least two possible explanations. First, the relationship probably is weak. It would be unreasonable to assert that staffing levels and assignment difficulty are the sole determinants of the quality of nursing care. On the contrary, personnel competencies, leadership styles, patient and staff personalities and many other variables may also have significant effects. The purpose in trying to identify a statistical relationship between the quality of nursing care and the difficulty of nursing assignments is not to predict quality, but rather to identify staffing requirements

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which will allow personnel to work at or near the highest level of quality possible in the face of other quality-related variables.

Stated another way, assigning staff in a way which will allow personnel to perform at difficulty levels which are statistically related to high levels of quality will remove the staffing variable as a contributor to poor quality care.

A second explanation for the weakness of the quality/difficulty relationship may be found in the fact that during the course of the study, days of extremely high difficulty occurred infrequently and somewhat intermittently. It is not unreasonable to expect that a highly qualified and motivated staff can maintain fairly high quality even at high levels of difficulty if these high levels do not occur with great frequency or regularity.

This latter explanation suggests that by viewing the relationship between quality and difficulty across units, instead of within units, a more readily discernable relationship might emerge. Because of different staffing levels and workloads across units, some units may work at consistently higher average difficulty levels than others. If it is true that consistently high levels of difficulty will impact more negatively on quality than will intermittently high levels, then units which consistently work at very high difficulty levels should have generally lower quality. In this context it is not surprising that the University of Missouri research produced an apparently stronger relationship between quality and difficulty, because it viewed the relationship across several units. The likelihood of observing instances of consistently high and low staffing increases as more units are observed.

Combined Unit Analysis

In order to view the quality/difficulty relationship across units, it is necessary to normalize the difficulty scales across units since the constant-sum paired-comparison procedure gives no assurance that the difficulty scales it produces are the same on different units. This need for normalization is not expressed in the University of Missouri project report. It is known, however, from conversations with personnel at Medicus Microsystems, Inc. of Chicago, Illinois, that as difficulty-based systems are implemented, normalization to the University of Missouri research difficulty scales occurs via the assumption that the medications assignment elements are equally difficult on all units. In the current research this assumption was also made.

The details of the normalization procedure are as follows: One unit is chosen as base. The ratios of the medications assignment element difficulties for each personnel class on the base unit to those of each of the other wards is computed. The geometric mean of these ratios within each personnel class on each ward is then used as a basis for scale normalization. The average assignment element difficulty values by personnel class on each of the other wards is then multiplied by the appropriate ratio to complete the normalization procedure. For example, if the geometric mean of the ratio of medications assignment element difficulty for hospital corpsmen on 7A compared to 7B were .75, the average assignment difficulty values for corpsmen on 7B would be multiplied by .75 to normalize them to the 7A difficulty scale for corpsmen. The same procedure would also be followed for the RN and LPN scales.

The above procedure for normalizing difficulty scales across units was used in the current study with 7A as the base ward. For normalization across personnel classes, all daily average assignment difficulties were divided by the overall average assignment difficulties of the personnel on 7A. Thus, in viewing the quality/difficulty relationship across units the weighted average relative difficulty is measured with respect to the overall average difficulty of assignments on 7A.

For the cross-unit analysis, data from all three study units were originally combined, but because of the atypical results and questionable data generated from 8A, all 8A data has been dropped from further consideration in the quality/difficulty analysis presented here. The combined data from 7A and 7B are presented in Figure 9. Again the triangles represent quality scores averaged over intervals of difficulty and the line represents the best least squares fit of the model:

$$Q = b_0 + b_1 \text{WARD} + b_2 \text{WARD}^2$$

In the combined case the model passes the F test for significance at the $\alpha = .0003$ level with $R^2 = .31$, indicating that it explains about 30% of the variation in the daily quality index.

Upon examining the quality index in more detail it is apparent that the portion of the quality index relating to the formulation of the nursing care plan shows the most consistent and rapid decline in the face of increasing difficulty. The relationship between difficulty of assignments and the quality of the nursing care plan is

Quality Versus Difficulty

Units 7A/7B Combined

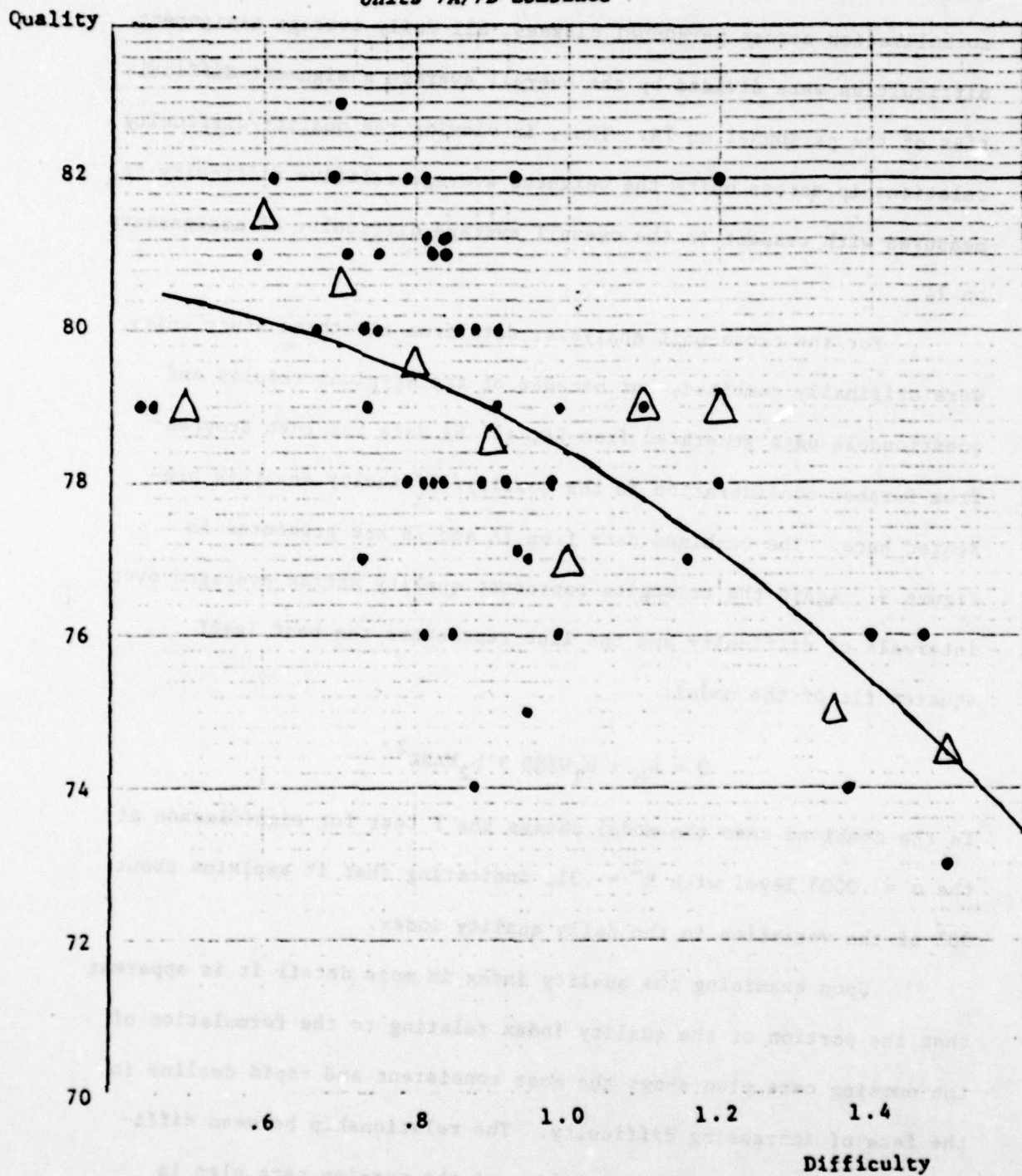


Figure 9

displayed in Figure 10. The average value of this portion of the index drops from the low 70's to the low 50's as the weighted average relative difficulty increases from .8 to 1.5. This suggests that as the difficulty of assignments increases, nursing personnel tend to neglect this aspect of their responsibilities in favor of attending to the physical and emotional needs of the patient, the indices for which show a less dramatic decline in the face of increasing difficulty.

Difficulty and Direct Care

On each of the three study units, the relationship between the difficulty of assignments and the percentage of time spent by nursing personnel in direct patient care activities was analyzed. Estimates of direct care time came from the work sampling study and include all items under the activity codes 11 and 12 (see Table 10), i.e., all activities performed in the presence of the patient. Although the general nature of the relationship viewed on each ward individually was essentially the same, for the sake of consistency with the quality/difficulty analysis, only wards 7A and 7B are included here in a combined analysis. The same normalization procedures used in the quality/difficulty analysis were applied in the direct care analysis. The measure of the percentage of time spent in direct patient care activities is the weighted average of that percentage by personnel class. This may be expressed mathematically as:

Nursing Care Plan Quality Versus Difficulty

Units 7A/7B Combined

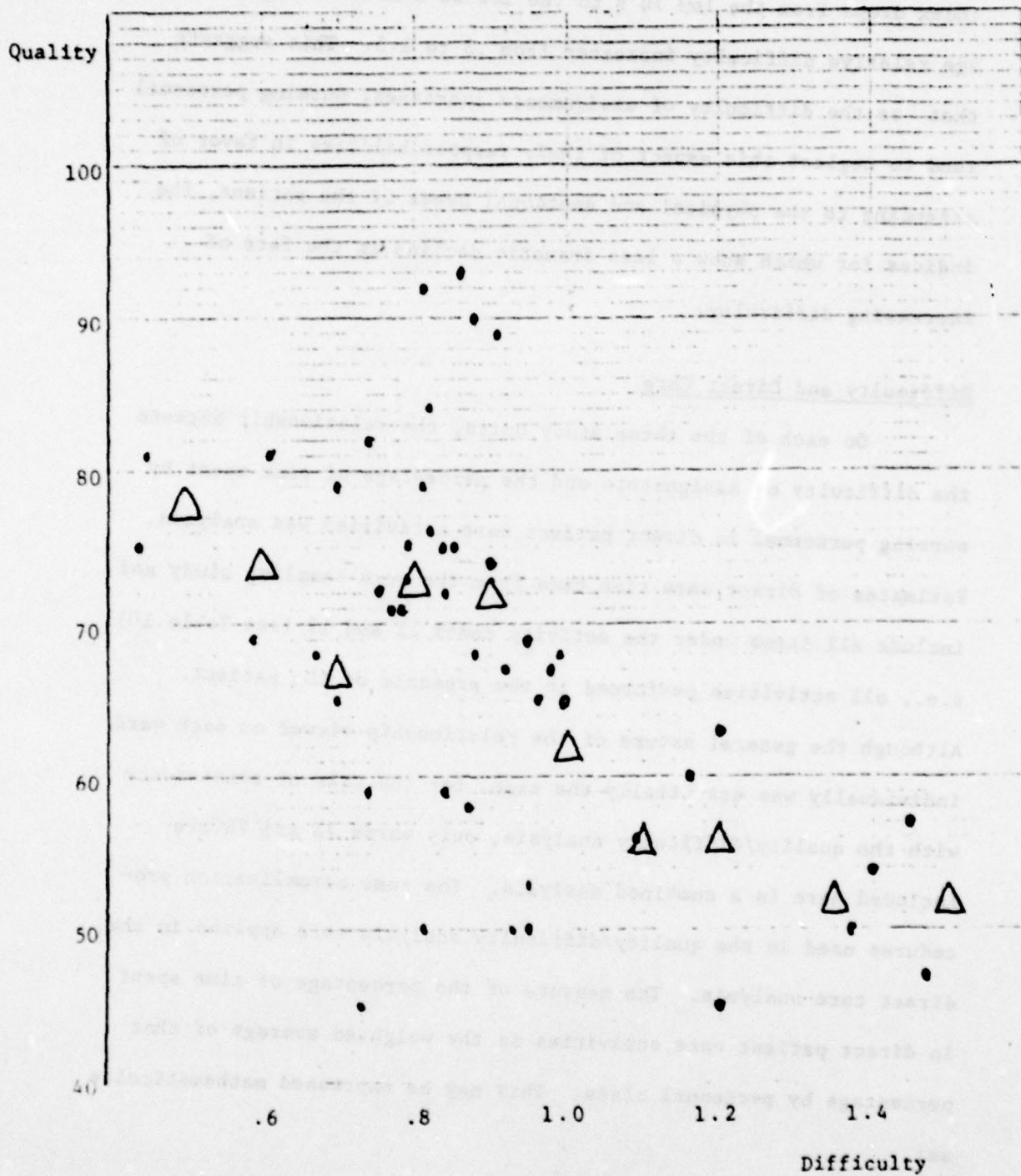


Figure 10

$$DCT = \frac{N_{RN} T_{RN} + N_{HM} T_{HM} + N_{LPN} T_{LPN}}{N_{RN} + N_{HM} + N_{LPN}}$$

where

DCT = overall percentage of time spent in direct patient care

N_{RN} = effective number of registered nurses available for patient care on the unit

N_{HM} = effective number of hospital corpsmen available for patient care on the unit

N_{LPN} = effective number of licensed practical nurses available for patient care on the unit

T_{RN} = the daily average percentage of time spent in direct patient care activities by registered nurses

T_{HM} = the daily average percentage of time spent in direct patient care activities by hospital corpsmen

T_{LPN} = the daily average percentage of time spent in direct patient care activities by licensed practical nurses.

The relationship between the percentage of time spent by personnel in direct patient care activities and the difficulty of assignments is displayed in Figure 11. Again the triangles represent average values of the dependent variable over intervals of difficulty. The curve superimposed on the plot is the best least squares fit of the model:

$$DCT = b_0 - b_1 / \text{WARD}$$

The F test for this model was significant at the $\alpha = .0001$ level with $R^2 = .37$, indicating that approximately 37 percent of the variation in the percentage of time spent by nursing personnel in direct patient care activities can be explained on the basis of the difficulty of their assignments. The results displayed in Figure 11 correspond closely with those obtained in the University of Missouri research.

% Direct Care Time Versus Difficulty

Units 7A/7B Combined

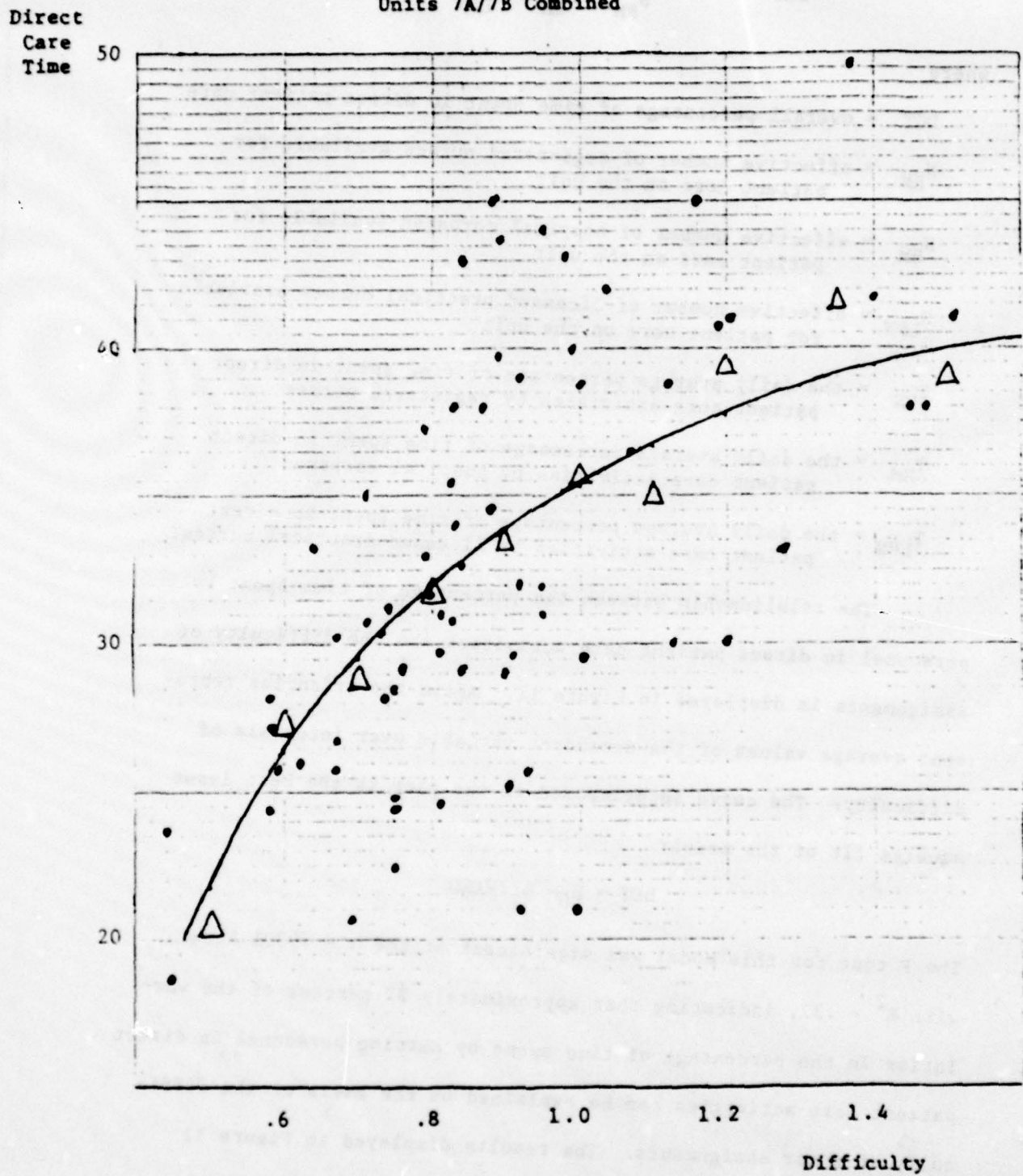


Figure 11

Implications for Staffing

The motivation for this study was the possibility of identifying levels of assignment difficulty which are optimal with respect to the quality of patient care, thereby allowing for the development of nursing personnel staffing systems for naval hospitals based on a quality-related workload measure. As an illustration of how the quality/difficulty relationship might be used to arrive at staffing recommendations, some sample staffing requirements will now be generated using the workload data collected on 7A, 7B and 8A during the course of the study. The quality/difficulty relationship from the 7A/7B combined data will form the basis for these recommendations. The discussion which follows is, however, only an illustration and very tentative in nature. Its purpose is to demonstrate how the choice of a particular difficulty level may affect staffing requirements. At this stage of the analysis a true "optimum" difficulty level has not been ascertained.

From the data collected at NRMHC, Charleston, it appears that no clearly optimal difficulty levels exist within the relevant range of workload. (See Figure 9.) That is to say, the average quality index appears to decline throughout the whole range of data. The peak of the quality/difficulty curve, according to the least squares regression model, would be found at .26 relative difficulty units. It would be neither prudent nor reasonable to recommend drastic increases in staffing to achieve such a low level of average relative difficulty. First, this "optimum" is outside the range of data used to predict it. Second, the decline in the

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average quality index is fairly gradual until very high levels of difficulty are experienced. Thus, according to the least squares model, average high quality care can be expected over a considerably broad range of relative difficulty. Only at very high levels of relative difficulty is the quality of care significantly affected. This line of reasoning would lead to a recommendation that staffing levels should be maintained at or slightly above the levels which existed during the course of the study. This would result in relative difficulty levels which are at or slightly below those encountered during the study.

Laying the least squares model aside, however, and examining the quality/difficulty plot of Figure 9 itself suggests an alternate conclusion. It will be noted that in the interval from .6 to .8 relative difficulty units, consistently high levels of quality are achieved. Between .8 and 1.0, however, performance with respect to quality is quite varied, quality being relatively low as often as it is high. In the interval from 1.4 to 1.6 units of relative difficulty, quality is low with consistency. These observations suggest that consistently high quality can best be maintained at levels of relative difficulty around .7. During the course of the study, the relative difficulty of assignments (relative to difficulty levels on 7A) averaged about .9 over the three units. In order to maintain average difficulty levels at the .7 level, it would therefore be necessary to increase staffing by approximately 30 percent. It should be pointed out, however, that based on the data collected, this relatively large increase in staff can only

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be expected to produce relatively small increases in average quality. The fact that such an observation can be made, however, emphasizes one of the potential strengths of the assignment element difficulty approach to staffing. It allows staffing judgments to be made in consideration of the effects of staffing levels on quality.

In order to generate specific staffing guidelines using the assignment element difficulty approach (assuming the quality/difficulty relationship is known), four basic types of information are necessary. First, it is necessary to know how many patients of which class require which activity groups to be performed for them. For long range staffing purposes, this information can be in the form of historical averages or future projections of such averages. For daily allocation decisions, daily patient mix and activity groups requirements would be necessary. In both cases, this workload data is required to identify the number of each type of assignment element required for the care of patients on the unit in question. For both long- and short-term staffing purposes this data can be collected on the Patient Classification Work Sheet, illustrated in Figure 4. It provides space to list the condition indicators used to classify patients and also provides space in which to indicate which activity groups need to be performed for each patient.

The second type of information needed to generate staffing requirements is information relative to how the assignment element workload should be allocated to the various personnel classes. This information is made available through an allocation matrix which will be described in the next section of the report.

The third type of information necessary to make staffing decisions is an estimate of how much assignment difficulty should be borne on the average by each member of each personnel class. This desired level of difficulty is the "capacity for difficulty" of each personnel class. Determination of capacities for difficulty is a research-based management decision. If the quality/difficulty relationship suggests a clear optimum within the relevant range of data, the levels of difficulty which correspond to this optimum may be taken as the capacities for difficulty for each personnel class. It is also possible, however, for a management decision to be made relative to desirable capacities for difficulty by making trade-offs between marginal increases (or decreases) in expected average quality and decreases (or increases) in average levels of difficulty. Since in the current phase of the study no clearly identifiable optimum levels of difficulty with respect to quality were found, the latter approach will be pursued here.

Because assignment element difficulty is based solely on patient care assignments, the fourth type of information necessary to generate staffing requirements is an estimate of how much time is available for each member of a particular class of personnel to devote to patient care activities. This information is obtainable from the work sampling study. It is taken to be the average percentage of time spent by members of a personnel class in patient-centered activities plus any excess personal time recorded (in this case any over 13 percent). An alternative to using work-sampling data for these estimates is to use professional nursing judgments

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of what the real or desired allocation of personnel time is between patient care and non-patient care activities.

The Allocation Matrix

An allocation matrix indicates what percentage of which assignment elements should be performed by which personnel class. It can be developed on the basis of historical practice or on the basis of idealized nursing judgments, or as a combination of the two approaches. Table 14 displays an allocation matrix for the patient care activity group on 7A. It simply records how assignment elements were distributed to personnel on 7A over the course of the study. For example, the assignment element "patient care for Class I patients" was distributed: 9 percent to RNs, 75 percent to hospital corpsmen and 16 percent to LPNs. Such an allocation matrix can be developed for each activity group on each unit from the study data.

TABLE 14

ALLOCATION MATRIX
FOR PATIENT CARE ON 7A
(ACTUAL)

PATIENT CATEGORY	PERSONNEL CLASS		
	RN	HM	LPN
I	9	75	16
II	8	73	19
III	13	66	21
IV	22	74	4

Table 15 displays an idealized allocation matrix for the patient care activity group on 7A. It was developed by presenting a group of professional nurses on 7A with a group of some 60 patient profiles and asking the nurses to judge which personnel class should be assigned to provide care for each activity group for each patient. The nurses were asked to make such judgments in consideration of both the level of personnel competence required and relative costs. If one class of personnel was a clear choice in terms of competence, that class was chosen; if not, the decision was made on the basis of the relative cost of employing alternative personnel. Such decisions were made by the nurses without knowledge of the classification of the patients represented in the profiles.

TABLE 15

ALLOCATION MATRIX
FOR PATIENT CARE ON 7A
(IDEAL)

PATIENT CATEGORY	PERSONNEL CLASS		
	RN	HM	LPN
I	1	64-98	1-35
II	31	37-61	8-42
III	26	21-47	18-54
IV	63	13-37	0-26

After the allocation decisions were made, the patient profiles were classified and the allocation matrix developed. The idealized matrix of Figure 13 shows, for example, that the assignment element "patient care for Class I patients" should be distributed: 1 percent to RNs, between 64 and 98 percent to hospital corpsmen, and between 1 to 35 percent to LPNs. The ranges for corpsmen and LPNs indicate that, for a considerable percentage of patients, the nurses judged that corpsmen and LPNs could be substituted for one another. As in the case of the actual allocation matrices, an ideal allocation matrix can be devised for each activity group on each unit.

Sample Staffing Requirements

Given the number of assignment elements required, how they should be allocated among the personnel classes, the capacities for difficulty of each personnel class and the percentage of time available for patient-care activities by personnel class, staffing requirements may be determined as follows:

1. Accumulate assignment elements according to the appropriate allocation matrix for each personnel class on each unit.
2. Weight the assignment elements according to the appropriate difficulty values for each personnel class on each unit.
3. Compute staffing requirements according to the following formula (RN example).

$$R_{RN} = \frac{W_{RN}}{C_{RN} P_{RN}}$$

where

R_{RN} = requirement for RNs

W_{RN} = weighted assignment element workload for RNs

C_{RN} = capacity for RNs

P_{RN} = percentage of time available for patient care for RNs.

In the case of the RN and corpsmen requirements, the number computed by the appropriate form of the above formula must be increased by one to allow for the presence of a charge nurse (RN) and a ward manager (HM).

Using the above procedure, sample staffing requirements were generated for each of the study units for the week of 2 April 1979. The workload data for this example were averaged over the week.

Three different sample requirements were determined. The first used the actual allocation matrix for each ward and assumed that the average assignment difficulties on 7A during the course of the study were appropriate capacity levels. This is referred to as the "actual allocation" alternative. The second used the same capacities, but the idealized allocation matrix for each unit. This is referred to as the "ideal allocation" alternative. The third used the ideal allocation matrix, but reduced the capacities for difficulty by 30% to show the effects on staffing of reducing average difficulty levels to seven-tenths of the average experienced on 7A. This is referred to as the ".7 ideal."

Tables 16 through 18 give sample requirements along with the average patient load during the week and the actual average staffing for the week for all three study units. It should be re-emphasized here that these sample requirements are given only as methodologic illustrations. Particularly in the case of the ".7 ideal," the intent is only to show the relationship of difficulty levels to staffing requirements. The least squares quality/difficulty curve of Figure 9 suggests that the large staff increases necessary to reduce difficulty to the .7 level would only result in a small percentage increase in the average quality index. Staffing decisions, in the final analysis, are management decisions. Analytic models can provide valuable information on which to base judgments, but they cannot make management decisions.

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TABLE 16
 SAMPLE STAFFING REQUIREMENTS
 FOR WEEK OF APRIL 2ND

UNIT 7A

PATIENT CATEGORY	I	II	III	IV	TOTAL
AVERAGE DAILY PATIENT LOAD	7.0	7.6	4.6	.8	20

AVERAGE REQUIREMENTS	PERSONNEL CLASS			
	RN	HM	LPN	TOTAL
ACTUAL	3.4	6.2	.8	10.4
ACTUAL ALLOCATION	4.4	4.9	1.1	10.4
IDEAL ALLOCATION	4.5	4.3	1.8	10.6
.7 IDEAL	5.7	5.6	2.4	13.7

TABLE 17
 SAMPLE STAFFING REQUIREMENTS
 FOR WEEK OF APRIL 2ND

UNIT 7B

PATIENT CATEGORY	I	II	III	IV	TOTAL
AVERAGE DAILY PATIENT LOAD	15.4	8.4	.4	0.0	24.2

AVERAGE REQUIREMENTS	PERSONNEL CLASS			
	RN	HM	LPN	TOTAL
ACTUAL	3.3	3.1	0.0	6.4
ACTUAL ALLOCATION	3.2	3.7	0.0	6.9
IDEAL ALLOCATION	2.2	4.9	0.0	7.1
.7 IDEAL	2.5	6.5	0.0	9.0

TABLE 18
 SAMPLE STAFFING REQUIREMENTS
 FOR WEEK OF APRIL 2ND

UNIT 8A

PATIENT CATEGORY	I	II	III	IV	TOTAL
AVERAGE DAILY PATIENT LOAD	28.4	12.4	0.0	0.0	40.8

AVERAGE REQUIREMENTS	PERSONNEL CLASS			
	RN	HM	LPN	TOTAL
ACTUAL	4.5	5.2	1.6	11.3
ACTUAL ALLOCATION	4.8	3.7	2.5	11.0
IDEAL ALLOCATION	4.4	4.8	2.1	11.3
.7 IDEAL	5.5	6.4	2.9	14.8

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Summary and Conclusions

Phase I of the project entitled "Assignment Element Difficulty as a Basis for Nursing Personnel Staffing at Naval Hospitals" has been successful in adapting and testing several research and management information tools which can be used to assess the relationship between the quality of patient care and difficulty of nursing assignments at naval hospitals. These tools are:

1. a patient classification system for general medical/surgical units,
2. a constant-sum methodology for assessing the difficulty of nursing assignments,
3. a Patient Classification Work Sheet for collection of the workload data necessary to assess the difficulty of assignments,
4. a process monitoring instrument for assessing the quality of nursing care on patient units,
5. a work sampling methodology for use on nursing units.

The above tools were used during a 35-day data collection period by staff members and civilian registered nurses who were hired and trained specifically for the study at the Naval Regional Medical Center, Charleston, South Carolina. This provided data for analysis of the relationship between the quality of nursing care and the difficulty of nursing assignments. The analysis revealed statistically significant evidence that relatively high levels of assignment difficulty are associated with relatively low levels of nursing quality. A quadratic least square regression model of the quality/difficulty relationship on two of the three units was developed and shown to explain approximately 30 percent of the variation in the daily quality index on the units.

Allocation guidelines to reflect real and ideal distributions of workload to RNs, hospital corpsmen and LPNs were developed and used to generate sample staffing requirements for the study units at different levels of average relative assignment difficulty. In so doing, a demonstration was made of how the assignment element difficulty approach might be employed to guide staffing decisions and assist in making trade-offs between the quality of nursing care and the quantity of nursing personnel required.

On the basis of the Phase I study, it is concluded that a demonstrable statistical relationship exists between the quality of nursing care and the difficulty of nursing assignments on the medical/surgical units at the Naval Regional Medical Center, Charleston. It is further concluded that this relationship can be employed to generate quality-related staffing guidelines for those units. If the assumption is made that the relationships between quality and difficulty found on the study units exist in general at naval hospitals, it may also be concluded that the assignment element difficulty approach to nursing personnel staffing has potential for use in uniform systems for nursing personnel staffing at naval hospitals.

Directions for Further Study

While the Phase I study has been generally successful in demonstrating the potential for developing nursing personnel staffing systems for naval hospitals based on assignment element difficulty, the fact that it was limited to three medical/surgical units

of a single hospital makes it imprudent to generalize its results. For this reason Phase II of the study will expand the examination of the quality/difficulty relationship to similar units of at least two other hospitals and several different units of the same hospital. This cross-unit investigation will allow for further confirmation and description of the relationship between the quality of nursing care and the difficulty of nursing assignments and will provide a stronger base from which to generalize the study results.

Because some speculation exists that the relatively elaborate workload measure, assignment element difficulty, may only be a surrogate measure for patient care time requirements, the relationship between difficulty and time requirements will also be examined during Phase II of the study.

Depending on the results of Phase II, a third and a fourth phase of the study are also planned. Phase III will attempt to apply the results of Phases I and II to develop staffing guidelines for a naval hospital other than NRM C Charleston. Depending on the results of Phase III and the mandate of the Navy Medical Department, Phase IV will concentrate on development of the management information systems necessary to implement the assignment element difficulty approach at all naval hospitals to assist in both long term staffing decisions and in the daily allocation of available personnel to patient care units.

APPENDIX A

A PATIENT CLASSIFICATION SYSTEM FOR MEDICAL/SURGICAL UNITS

The assignment element difficulty approach to staffing utilizes a patient classification system which categorizes patients according to their dependence on nursing personnel. It is assumed that a patient care assignment will be more or less difficult depending on the ability of the patient to assist with his care. Since no one system could be found which completely met the needs of the study units, a patient classification system was developed using materials from Medicus Microsystems, Inc. as a guide and incorporating the best features of several systems already in use. The patient classification system used in the Phase I study divides patients into four categories which reflect their level of dependency on nursing personnel. These categories are:

- I. Minimum Care - Patients in this category require little or no assistance with activities of daily living. They require a minimal amount of nursing care relative to medications, treatments and teaching needs.
- II. Intermediate Care - Patients in this category generally require assistance with or supervision of most activities of daily living. They require more than minimal care relative to their medications, treatments, teaching and emotional needs. They do not, however, require frequent skilled care and observation throughout the shift. Their nursing care needs, although significant, are generally intermittent in nature.
- III. Complete Care - Patients in this category require frequent skilled nursing care throughout the shift. They require the assistance of nursing personnel to initiate, supervise or mediate the performance of most activities of daily living and may require frequent and complex medications and treatments. They may also require significant amounts of teaching and emotional support.

- IV. Intensive Care - Patients in this category require continuous skilled nursing care throughout the shift for the prevention of complications and may be in and out of control. Frequent re-evaluation is necessary so that immediate adjustment of therapy can be undertaken.

Condition Indicators

The division of patients into four categories is accomplished through the use of weighted condition indicators which are identified for each patient. The condition indicators are readily observable aspects of a particular patient's condition, generally relating to nursing care procedures and activities of daily living. They reflect the patient's level of dependence in the areas of bathing, eating and mobility as well as giving specific information relating to treatments, emotional and teaching needs, mental capacity, etc. Condition indicators were arrived at after careful review of the indicators used in several existing systems, consultation with ward nurses at three Naval hospitals, and review and revision by a working committee at the study hospital. The resulting thirty-four indicators are listed with their weights in Table A1.

Quantitative Guidelines

To describe the condition of a particular patient, some or all of the 34 indicators may be appropriate. The specification of all appropriate indicators should be sufficient to place a particular patient in one of the dependency categories. Since some indicators have more (or less) individual impact on a patient's level of dependency, psychological scaling techniques were used to weight the impact of each condition indicator in conformance with

Table A1

Patient Classification Condition Indicators

INDICATORS	SUBGROUP CODES	SUBGROUP DESCRIPTORS	WEIGHTS
A. Isolation	1	Enteric	2
	2	Respiratory or wound	4
	3	Protective or strict	8
B. Mobility	4	Ambulatory with crutches, etc.	3
	5	Assist in bed	5
	6	Total	10
C. Bath	7	Self	-2
	8	Assist	2
	9	Total	7
D. Feeding	10	Self	-1
	11	Assist	3
	12	Total	8
E. Incontinent or Diaphoretic	13		7
F. Sensory Deficits	14		7
G. Vital Signs	15	Every 2 hours	7
	16	Every hour	9
	17	More than every hour	11
H. Confused or Disoriented	18		9
I. Intravenous	19	Single	3
	20	Multiple	5
	21	Blood or Hyperalimentation	8
J. Special Medications	22		5
K. Treatments	23	Fifteen minutes or less	3
	24	Greater than fifteen minutes	5
L. Surgery or Special Procedures	25	One	5
	26	More than one	6
M. Tubes	27	One	3
	28	More than one	5
N. Respiratory Therapy	29		4
O. Emotional Needs	30	Fifteen minutes or less	4
	31	More than fifteen minutes	7
P. Teaching Needs	32	Fifteen minutes or less	3
	33	More than fifteen minutes	6
Q. Accompany off unit	34		5

the judgment of a panel of nurses. Details of the weighting procedure may be found in a Naval School of Health Sciences research paper by J.E. Montgomery, entitled "Weighting of Patient Classification Indicators Based on Sorting and Ranking Procedures," April 1979.

Guidelines for determining patient classification based on sums of indicator weights were developed in the following manner. Two nurses working independently of one another assigned condition indicators to 76 hypothetical nursing care plans. Differences in the assigned indicators were settled by consultation between the two nurses until agreement was reached on the appropriate indicators for each patient. The same nursing care plans were then given to two panels of nurses who classified them according to the broad category definitions given above. The numerical weights assigned to the condition indicators of each patient were summed and the resulting totals were compared with the patient class assigned to each patient by the nursing panel. Numerical ranges for the sums were then established which provided the greatest agreement between the weighted total of condition indicators and the dependency class of the patient determined by the nursing panel. The resulting intervals were: Class I, -3 through 7 points; Class II, 8 through 29 points; Class III, 30 through 59 points; and Class IV, 60 or more points. In subsequent testing of the classification weights and boundaries, the classification system has been shown to be approximately 90% consistent with consensus nursing judgment relative to proper patient classification.

Recording Patient Classification Information

The patient classification work sheet used during the course of the study is displayed in Figure A1. At the top of the form space is provided for identifying information and the condition indicators are displayed in abbreviated form with a set of code numbers which apply to the indicators. The first four columns of the form provide space to list patient names, applicable condition indicator codes, weight totals and the classification category determined for each patient. Summary statistics on patient classification are recorded at the bottom of the sheet. The last five columns do not apply to patient classification, but were included during the course of the study to record information on patient care assignments. Instructions for completing the work sheet emphasize that the individual assigning condition indicators should refer to the detailed indicator definitions (which are given in an instructional packet) and not rely on the limited condition indicator labels used on the work sheet.

Problems

Initial testing of the patient classification system on the wards revealed a great deal of inconsistency among nurses classifying the same patients on the same day. Consultation with the working committee suggested several possible reasons for this inconsistency. For example, the condition indicator definitions may not have been clear, the nurses may have had different levels of knowledge about the patients' nursing care needs, the nurses

the judgment of a panel of nurses. Details of the weighting procedure may be found in a Naval School of Health Sciences research paper by J.E. Montgomery, entitled "Weighting of Patient Classification Indicators Based on Sorting and Ranking Procedures," April 1979.

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WARD _____ DATE _____ CLASSIFIER _____

PATIENT CLASSIFICATION WORK SHEET

CONDITION INDICATORS	SUBGROUP CODING			CONDITION INDICATORS	SUBGROUP CODING		
	I	II	III		I	II	III
A. ISOLATION	1	2	3	J. SPECIAL MEDICATIONS	22	24	25
B. MOBILITY	4	5	6	K. TREATMENTS	23	26	27
C. BATHING	7	8	9	L. SURGERY/SPEC. PROC.	24	28	29
D. FEEDING	10	11	12	M. TUBES	25	30	31
E. INCONTINENT	13	14	15	N. RESPIRATORY THERAPY	26	32	33
F. SENSORY DEFICITS	16	17	18	O. EMOTIONAL NEEDS	27	34	35
G. VITAL SIGNS	19	20	21	P. TEACHING NEEDS	28	36	37
H. CONFUSED/DISORIENTED	22	23	24	Q. ACCOMPANY OFF UNIT	29	38	39
I. IV THERAPY	25	26	27				

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PATIENT	APPLICABLE SUBGROUP CODES	POINT TOTAL	CLASS	ACTIVITY GROUPS				
				PT CARE	WEDS	TEAM LDNG	ADM	ASSESS
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13.								
14.								
15.								
16.								
17.								
18.								
19.								
20.								
21.								
22.								
23.								
24.								
25.								
26.								
27.								
28.								
29.								
30.								

SUBPART CLASS I ☐ CLASS II ☐ CLASS III ☐ CLASS IV ☐

Figure A1

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may have had differing philosophies about what constitutes a need for emotional support or teaching or they may have had different definitions of a tube, a treatment, respiratory therapy, etc. The original form of the work sheet added to the inconsistency since it was not easy to mark correctly.

Efforts were made to correct these problems and to insure strict adherence to the condition indicator definitions. The work sheet was also revised to minimize errors. Definitions of the indicators which seemed to be used most inconsistently were rewritten and specific examples of tubes, etc. were included. Since teaching and emotional needs were a particular problem, it was decided that they would be marked only if they were specifically addressed in the nursing care plan. Efforts were made to update and improve nursing care plans so they contained most of the information required to show a patient's level of dependency.

Instructions to Users

Classes were conducted for the charge nurses who would be classifying patients and for the area nursing supervisors who would be making periodic checks of patient classification prior to the primary data collection period. Strong emphasis was placed on the need to insure accurate and up to date nursing care plans, as they were the primary source of information for selecting condition indicators. Other sources of information, such as the clinical record, the TPR log, and stat order sheets were also emphasized. Condition indicator definitions were reviewed and discussed, with

special attention being given to those requiring interpretation or judgment. Using hypothetical nursing care plans, the instructor gave examples of condition indicator selection. Finally, the charge nurses and supervisors practiced selecting condition indicators and discussed differences in selection.

Implementation

Patient classification began slowly on the study wards with the classification of five patients on each ward each weekday. The number of patients classified each day was increased gradually until all patients on each of the study wards were being classified. The patient classification work sheet was completed by the charge nurse on each ward by the end of the A.M. shift each weekday throughout the course of the study. The charge nurses listed each patient by name and recorded the code numbers of all condition indicators that applied to a particular patient on the A.M. shift. Conversion of indicator codes to weights, summing of weights and determination of patient classifications was done independently at a central location, using a hand held calculator. If the patient's condition changed after the initial classification was done, appropriate condition indicators were added. When a charge nurse was off duty, the patients were classified by a relief charge nurse who had received individual instruction in use of the classification system.

Patient classification checks were done prior to the primary data collection period by the area nursing supervisors. Classification work sheets were scrutinized daily by the nurse research coordinator throughout the primary data collection period and questionable condition indicator entries were discussed with the charge nurse.

The nurse research coordinator also made random checks of the system's use by classifying ten patients on each study ward once each week during the last four weeks of the primary data collection period. She did this with no personal knowledge of the patient's condition, using only the information available on the nursing care plan. Comparisons were made between the coordinator's classification and the charge nurse's classification of the patients. In most instances of disagreement, it was determined that the coordinator lacked sufficient knowledge of the patient's condition because the nursing care plan was not up to date and did not accurately reflect the patient's condition. On nine occasions, the charge nurse inadvertently omitted a condition indicator which had been correctly noted by the coordinator. Differences in overall classification between the coordinator and the charge nurses occurred in 31 of 151 classifications. Consultation between the coordinator and the charge nurses produced agreement that the charge nurses had the correct classification in all but 4 cases. Monitoring of relief charge nurses' classifications revealed that errors made usually involved the omission of a relevant condition indicator which applied, rather than in marking an inappropriate indicator.

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In the classification of 203 patients by relief charge nurses, the overall classification was affected by such errors in 11 cases, resulting in each case in the patient being classified too low, rather than too high.

APPENDIX B

THE METHOD OF CONSTANT-SUM PAIRED-COMPARISONS

Introduction

The method of constant-sum paired-comparisons is a psychological scaling technique used to create a ratio scale on which to measure attributes of objects or situations which do not typically lend themselves to direct and objective comparisons with known standards. As an example, take the relative beauty of a collection of art objects. Measurements of this nature are generally conceived of as being determined at an ordinal level. That is, a critic may feel comfortable in stating that object A is more beautiful than object B, but not that A is twice as beautiful as B or three and a half times as beautiful. The constant-sum paired-comparisons method (hereafter referred to as CSPC) is a technique which employs subjective judgments to construct appropriate scales, allowing for these latter ratio comparisons.

Basic Assumptions

There are two major assumptions, attributable to Thurstone, on which the CSPC method and most other psychological scaling techniques are based [8]. First, it is assumed that the objects being scaled do in fact have some true scale position in terms of the attribute of interest. Second, it is assumed that each individual judgment concerning the objects being scaled is subject to normally distributed errors in perception of the true relative scale values

caused by a large number of factors which may be conceived of as purely random phenomena. These two assumptions imply that, although individual judgment of relative scale values are in error, the mean of a large number of such judgments may be used to estimate the true relative scale positions of objects with respect to the attribute of interest.

An Example

The steps of the CSPC method are perhaps most easily explained by reference to a simple example. The example we will use is the subjective estimation of the relative lengths of four lines; call them A, B, C and D. The data collection form used is displayed as Figure B1. While this particular example does not concern itself with an attribute which is generally considered in need of assessment by a psychological approach, it has the advantage of producing results which may be quickly verified using a more standard measurement device: the common ruler. The procedure followed in this example is outlined by Torgerson [5].

As indicated in Figure B1, each judge was asked to divide a constant sum of 100 points between the members of each possible pairing of lines A, B, C and D in proportion to the relative length of the lines. Thus in a comparison of lines A and B, 40 points to A and 60 to B would indicate a judgment that B is 1.5 times as long as A. Assigning 25 points to A and 75 to B would indicate a judgment that B is three times as long as A, and so forth. Notice that in the pairings as presented, there is an attempt made to balance

(32)

SUBJECTIVE ESTIMATION

A _____

B _____

C _____

D _____

Without measuring, give your subjective estimate of the relative length of lines A, B, C, and D above by dividing 100 points between each possible pairing of the lines.

Example: If you think line C is one third as long as line A, assign 25 points to C and 75 to A.

A _____	D _____	B _____
B _____	B _____	C _____
100	100	100
C _____	A _____	C _____
D _____	D _____	A _____
100	100	100

Figure B1

the comparisons in terms of how often each line is presented as the first member of a pair, how often the first members of the pair are shorter than the second and how closely spaced pairs are involving the same members. This is done to balance any bias which may be introduced into judgments by these factors. Table B1 gives the average breakdown of points for each possible paired comparison.

Using the information in Table B1 we can easily compute the ratios of the average number of points allocated to one line against another. We simply divide the average number of points given to one line in a pair by the average number given to the other. These ratios are displayed in Table B2. They are estimates of the length of each line relative to each other line, however, they are only one set of possible estimates. Several other sets of estimates are possible. For example, the ratio of A to B could be estimated from the ratio of the ratios of A to C and B to C, or from the ratio of the ratios of A to D and B to D.

We thus have three ways to estimate the relative length of A compared with B. In general if n comparisons are made, $n-1$ independent estimates of each ratio are possible. Notice, however, that in the case of A compared with B each estimate is different. The direct ratio of A to B is .579. The two indirect ratios referred to above are .559 and .614 respectively.

Table B1

Average number of points assigned to each member
in constant-sum paired comparisons
of relative line length estimation.
(15 observations)

Pairing	Average Allocation of 100 points		Sample Standard Deviation of Points to Each Member
	1 st member	2 nd member	
AB	36.67	63.33	3.83
AC	65.07	34.93	11.97
AD	44.53	55.47	10.01
BC	76.93	23.07	5.87
BD	56.67	43.33	5.12
CD	33.40	66.60	6.49

Table B2

Ratios of points allocated between pairs of lines
in constant-sum paired-comparisons
of relative line lengths

Pairs	Ratio of 1 st member to 2 nd member
AB	.579
AC	1.863
AD	.803
BC	3.335
BD	1.308
CD	.501

The fact that each of the $n-1$ estimates is different may be explained by the random error made by each judge at the moment of judgment. Slightly different errors were made in comparing A to B and A to C, etc. This condition suggests taking an average of the $n-1$ independent estimates as the best estimate of the true ratio of line lengths. Because we are dealing with ratios, the average we use is the geometric mean rather than the more common arithmetic mean. The geometric mean is simply the $(n-1)^{\text{th}}$ root of the product of the $(n-1)$ independent ratio estimates. So, for the estimate of the relative length of lines A and B discussed above, we choose:

$$\sqrt[3]{(.579) (.559) (.614)} = .584$$

By similar calculations we may estimate the ratio of A to C to be 1.793 and A to D to be .828.

Now if we take the length of line A as our unit of measure, we estimate that the four lines A, B, C, D stand in relationship to each other by length as do the numbers:

$$1.00, 1.71, 0.58, 1.21$$

This is done simply by solving the following equations for x , y and z :

$$.584 = \frac{1}{x}, \quad 1.793 = \frac{1}{y}, \quad .828 = \frac{1}{z}$$

where x , y and z are the relative lengths of lines B, C and D respectively, measured in units of the length of line A.

(8)

The measured line lengths, to the nearest millimeter, were, for lines A, B, C and D respectively:

57, 93, 27, 63

for a total length of 240 millimeters. Dividing this total into four parts in proportion to the ratio estimates above gives the following millimeter estimates for lines A, B, C and D respectively:

53, 91, 31, 65.

Torgerson describes a least-squares procedure for developing scale estimates using logarithms. In general, he shows that the logarithm of a suitable scale estimate for an object i in the CSPC technique can be given by the formula:

$$(1) \quad \log \hat{s}_i = \frac{1}{n} \sum \log \hat{w}_{ji}$$

where

\hat{s}_i = the scale estimate for object i

\hat{w}_{ji} = the ratio of the average number of points given to object j and the average number of points assigned to object i in paired-comparisons of i and j
(w_{ii} is assumed to be unity)

n = the number of objects being compared.

The computational procedure used in this study was a slight modification of the approach. The scale estimate for object i was taken to be:

$$(2) \quad \hat{s}_i = \left(\prod_{\substack{j=1 \\ j \neq i}}^n \hat{w}_{ji} \right)^{\frac{1}{n-1}}$$

It can be shown that the major difference between formulas (1) and (2) as a basis for estimates of the scale values s_i is that in (1) there is an implicit double weighting of the direct ratio comparison of objects i and j , whereas in (2) the direct comparison is weighted equally with the $n-2$ indirect comparisons. In several trials of these alternative computational formulas, no significant differences in the internal consistency of the ratio scale estimates derived were noted. (For further details of the CSPC computational procedures employed in this study see the NSHS Research Paper by J.E. Montgomery entitled "The Method of Constant-Sum Paired-Comparisons, A Primer," August 1978.)

APPENDIX C

DAILY PATIENT CARE QUALITY QUESTIONS

The questions on the following pages formed the basis for the daily quality index used in this study. As indicated in the main body of the study report, random subsets of these questions were asked concerning the care of six patients on each study unit each day. The daily quality index was computed as the percentage of "yes" answers recorded for all applicable questions.

THE PLAN OF NURSING CARE IS FORMULATED

THE CONDITION OF THE PATIENT IS ASSESSED ON ADMISSION

IF THE PATIENT HAS PHYSICAL DISABILITIES, E.G., SENSORY OR MOTOR IMPAIRMENT SUCH AS IMPAIRED HEARING, VISION, SPEECH, ETC. ARE THEY RECORDED ON ADMISSION.

IS THERE A STATEMENT ABOUT ALLERGIES WRITTEN AT THE TIME OF ADMISSION TO THIS UNIT?
(REFERS TO STATEMENT OF PRESENCE OR ABSENCE OF ALLERGIES. CODE NA IF INFORMATION RECORDED ON ADMISSION TO ANOTHER UNIT.)

IF THE PATIENT DEPENDS ON PROSTHETIC DEVICES FOR ADL, IS THIS RECORDED ON ADMISSION.
(DEPENDS MEANS THAT THE PATIENT USES OR HAS PROSTHETIC DEVICES FOR ADL. PROSTHETIC DEVICES REFER TO ANY DEVICE USED FOR ADL, E.G., DENTURES, GLASSES OR CONTACT LENSES, HEARING AIDS, ORTHOPEDIC SHOES OR BRACES, ARTIFICIAL LIMBS OR EYES. MAY INCLUDE DEVICES SUCH AS WIGS. ADL MEANS MINIMAL ACTIVITIES REQUIRED FOR DAILY PERSONAL CARE, E.G., EATING, TOILET, DRESSING, AMBULATION. CODE NA IF PATIENT INITIALLY ADMITTED TO ANOTHER UNIT.)

ARE BEHAVIORS INDICATIVE OF MENTAL-EMOTIONAL STATE RECORDED AT THE TIME OF ADMISSION TO THIS UNIT?
(DO NOT CODE NA FOR ADULTS OR CHILDREN; MAY CODE NA FOR INFANTS. APPLIES TO STATEMENTS OF BEHAVIOR, E.G., ALERT, TALKATIVE, ANXIOUS, DEPRESSED, MENTALLY RETARDED, ETC.)

IS THERE A STATEMENT WRITTEN AT TIME OF ADMISSION TO THIS UNIT ABOUT THE CONDITION OF THE SKIN?
(REFERS TO DRYNESS, TURGOR-HYDRATION, ABSENCE OR PRESENCE OF SKIN LESIONS, LOCALIZED SKIN COLOR, WARMTH, ETC. DO NOT ACCEPT GENERAL DESCRIPTION SUCH AS "PALE." DO NOT CODE NA. APPLIES TO ALL PATIENTS ON THIS UNIT.)

DATA RELEVANT TO HOSPITAL CARE ARE ASCERTAINED ON ADMISSION

IS THE GENERAL PHYSICAL APPEARANCE OF THE PATIENT RECORDED AT ADMISSION TO THIS UNIT?
(ACCEPT ANY DESCRIPTION OF PHYSICAL APPEARANCE, E.G., PALE, EMACIATED, OBESE. DO NOT ACCEPT REFERENCE TO AGE, SEX, RACE, MARITAL STATUS. DOES NOT INCLUDE BEHAVIORAL DESCRIPTION. DO NOT ACCEPT GENERAL DESCRIPTION SUCH AS "IN ACUTE DISTRESS". DO NOT CODE NA. APPLIES TO ALL PATIENTS ON THE UNIT.)

IS HEIGHT RECORDED ON ADMISSION TO THIS UNIT?
(CODE NA IF INFORMATION RECORDED ON ADMISSION TO ANOTHER UNIT.)

IS WEIGHT RECORDED ON ADMISSION TO THIS UNIT?
(CODE NA IF INFORMATION RECORDED ON ADMISSION TO ANOTHER UNIT.)

IS THERE A STATEMENT WRITTEN AT THE TIME OF ADMISSION TO THIS UNIT) ABOUT WHETHER THE PATIENT IS TAKING MEDICATIONS?
(ACCEPT ANY DESCRIPTION OF OR REFERENCE TO THE FACT THAT THE PATIENT IS OR IS NOT TAKING MEDICATION. CODE NA IF INFORMATION RECORDED ON ADMISSION TO ANOTHER UNIT. DO NOT CODE NA IF PATIENT

INITIALLY ADMITTED TO THIS UNIT.)

ARE EITHER THE DIET OR THE FOOD PREFERENCES OF THE PATIENT RECORDED WITHIN THE FIRST SHIFT ON ADMISSION TO THIS UNIT?
(CODE NA IF INFORMATION RECORDED ON ADMISSION TO ANOTHER UNIT.
DO NOT CODE NA IF PATIENT INITIALLY ADMITTED TO THIS UNIT. INCLUDES REFERENCE TO DIETARY CONSIDERATIONS BASED ON RELIGIOUS BELIEFS OR CUSTOMS.)

THE CURRENT CONDITION OF THE PATIENT IS ASSESSED

IS THERE A WRITTEN STATEMENT ABOUT THE CURRENT CONDITION OF THE SKIN?
(RELATES TO DRYNESS, TURGOR-HYDRATION, ABSENCE OR PRESENCE OF SKIN LESIONS, LOCALIZED SKIN COLOR, WARMTH, ETC. DO NOT ACCEPT GENERAL DESCRIPTION SUCH AS "PALE." SHOULD APPLY TO PRESENT STATUS.
REFERS TO PATIENTS WHO MAY BE EXPECTED TO HAVE SKIN PROBLEMS.)

ARE RESPIRATORY RATE AND QUALITY RECORDED?
(QUALITY REFERS TO DESCRIPTIONS SUCH AS SHALLOW, LABORED, GRUNTING, CHEYNE-STOKES, RETRACTING, ETC. APPLIES TO PATIENTS WITH RESPIRATORY CONDITIONS, CONDITIONS IN WHICH RESPIRATORY INVOLVEMENT IS ANTICIPATED, OR WHEN OTHERWISE NECESSARY, E.G., STROKE PATIENT, PATIENT ON RESPIRATOR, HYPERGLYCEMIC PATIENT, ETC. MUST BE RECORDED WITHIN THIS SHIFT. BOTH RATE AND QUALITY NECESSARY FOR YES ANSWER.)

THE PHYSICAL NEEDS OF THE PATIENT ARE ASSESSED

THE PATIENT IS PROTECTED FROM ACCIDENT AND INJURY

IS THE PATIENT WEARING AN IDENTIFICATION BRACELET OR TAG?
(PATIENT MUST BE WEARING SOME FORM OF IDENTIFICATION BRACELET OR TAG, EVEN IF NOT REQUIRED BY HOSPITAL POLICY. DO NOT ANSWER NA.)

IS THE PATIENT IN A POSITION OF OPTIMAL BODY ALIGNMENT?
(OBSERVE POSITION OF FEET, LEGS, KNEES, TRUNK, SHOULDERS, ARMS, AND HEAD. ANSWER NO IF ANY PART OF BODY NOT PROPERLY ALIGNED.)

IS THE IV NEEDLE ADEQUATELY SECURED IN PLACE?
(OBSERVE TO SEE IF IV NEEDLE ADEQUATELY TAPED, WITH ARMBOARD IF APPROPRIATE.)

IF SPECIFIC PRECAUTIONS ARE REQUIRED WHEN THE PATIENT GETS INTO OR OUT OF BED (E.G., PATIENTS WITH IVS, TUBING, DRESSINGS, INCISIONS, CRUTCHES, MUSCLE WEAKNESS, ETC.) ARE APPROPRIATE INSTRUCTIONS GIVEN?
(OBSERVER MUST DETERMINE WHETHER SPECIAL PRECAUTIONS ARE NECESSARY. IF THEY ARE, ASK PATIENT: "DID SOMEONE TELL YOU HOW TO BE CAREFUL WITH (TUBES, WEAKNESS, OR SPECIAL CONDITION) WHEN YOU GET UP?" IF NO SPECIAL PRECAUTIONS ARE NECESSARY FOR THIS PATIENT, CODE NA.)

ARE ASSIGNED NURSING STAFF INFORMED OF THE PATIENT'S PRESENT STATUS?
(TO NURSE: "WHAT IS HIS CONDITION TODAY, OR WHAT IS HIS PRESENT STATUS?" OBSERVER MUST KNOW PATIENT'S PRESENT STATUS. IF NURSE ANSWERS INCORRECTLY, RECORD NO.)

ARE MEDICATIONS FOR SELF-ADMINISTRATION LABELED WITH PATIENT'S NAME AND NAME AND DOSAGE OF DRUG?
(TO PATIENT: "ARE THERE ANY MEDICINES YOU ARE SUPPOSED TO TAKE BY YOURSELF WHILE IN THE HOSPITAL?" IF YES, "COULD I PLEASE SEE THEM?")

ARE THE BEDSIDE TABLE AND OTHER SELF-CARE EQUIPMENT POSITIONED WITHIN THE PATIENT'S REACH?

IN ROOMS WHERE OXYGEN IS IN USE, IS SMOKING PROHIBITED BY POSTED SIGN?
(CODE NO IF NO SIGN POSTED OR IF ANYONE IS SEEN SMOKING IN ROOM.)

ARE SIDERAILS UP IF THE CONDITION OF THE PATIENT SO WARRANTS?
(OBSERVER MUST DETERMINE IF PATIENT'S CONDITION WARRANTS HAVING SIDERAILS UP, E.G., PATIENTS WHO ARE RESTLESS, DISORIENTED, ON SEIZURE PRECAUTIONS, HAVE RECEIVED NARCOTICS OR SEDATIVES, ETC.)

ARE ALL NURSING PROCEDURES CURRENTLY DONE FOR THIS PATIENT SPECIFICALLY ORDERED IN WRITING BY EITHER PHYSICIAN OR NURSE?
(ANSWER NO IF ANY PROCEDURES ARE NOT SPECIFICALLY ORDERED, E.G., A CATHETER IRRIGATION DONE WHEN IT IS NOT ORDERED. ETC.)

ARE ALL WHEELS LOCKED WHEN PATIENT IS ASSISTED INTO OR OUT OF BED AND/OR WHEELCHAIR?
(ALL WHEELS MUST BE LOCKED FOR YES ANSWER.)

IS BED IN SAFEST POSITION EXCEPT WHEN TREATMENTS ARE BEING DONE?

(11)

IS ALL ELECTRIC EQUIPMENT GROUNDED (I.E., EACH PEICE HAS A 3-PRONG PLUG?)

(REFERS TO ALL ELECTRIC EQUIPMENT IN THE PATIENT'S ROOM. WHETHER HOSPITAL OR PATIENT-OWNED. INCLUDES EQUIPMENT NOT CURRENTLY BEING USED.)

IS THE BED AT LEAST 6 INCHES FROM THE ELECTRIC OUTLET?

IS ALL ELECTRIC EQUIPMENT AT LEAST 6 INCHES FROM THE BEDFRAME?

ARE ALL ELECTRIC CORDS SMOOTH, WITH NO FRAYED ENDS OR EXPOSED WIRES?

IF PROTECTIVE OR SUPPORTIVE DEVICES (E.G., RESTRAINTS, DONUT RINGS, HEEL GUARDS, FOOTBOARDS, SANDBAGS, PILLOWS, ETC.) ARE BEING USED, ARE THEY USED PROPERLY TO PROVIDE SUPPORT OR PREVENT INJURY? (CHECK POSITION OF PROTECTIVE OR SUPPORTIVE DEVICE IN RELATION TO BODY AREA.)

IS THERE A LIST OF PATIENT'S ALLERGIES ON THE FRONT OF THE CHART?

THE NEED FOR PHYSICAL COMFORT AND REST IS ATTENDED

IS THE PATIENT ABLE TO REACH THE WATER GLASS AND PITCHER? (DOES NOT APPLY TO INFANTS AND SMALL CHILDREN. ALWAYS APPLIES TO ADULTS UNLESS NPO. IF PATIENT DOES NOT HAVE BOTH WATER GLASS AND PITCHER WITHIN REACH, CODE NO.)

WAS THE PATIENT'S HAIR COMBED TODAY? (TO PATIENT: "WAS YOUR HAIR COMBED TODAY?")

HAS THE PATIENT RECEIVED ATTENTION TO COMPLAINTS OF PAIN, NAUSEA, OR VOMITING?

(TO PATIENT: "HAVE YOU HAD ANY PAIN OR HAVE YOU BEEN SICK TO YOUR STOMACH?" IF NO TO BOTH, CODE NA. IF YES TO EITHER: "WAS SOMETHING DONE TO HELP YOU FEEL BETTER?")

IS THE BED CLEAR OF EXTRANEIOUS ITEMS? (E.G., SUPPLY WRAPPERS, SYRINGES, ETC. DOES NOT REFER TO PERSONAL ITEMS APPARENTLY PUT THERE BY PATIENT.)

IS THE CALL LIGHT WITHIN THE PATIENT'S REACH? (OBSERVE WHETHER LIGHT IS WITHIN PATIENT'S REACH. CODE NA ONLY FOR INFANTS AND SMALL CHILDREN AND COMATOSE PATIENTS.)

IS LIGHTING CONTROLLABLE FOR THE PATIENT? (OBSERVE TO DETERMINE IF PATIENT CAN TURN LIGHT ON AND OFF. MAY BE NA FOR SMALL CHILDREN, INFANTS, AND COMATOSE PATIENTS.)

ARE MEASURES FOR RELIEF OF PAIN PROVIDED BY THE NURSING STAFF (E.G., CHANGING PATIENT'S POSITION, SPLINTING AND INCISION OR PAINFUL AREA, OR GIVING MEDICATION)?

(TO PATIENT: "HAVE YOU BEEN TROUBLED WITH PAIN TODAY?" OR "YOU MENTIONED THAT YOU'VE HAD SOME PAIN." IF NO, CODE NA. IF YES: "DID YOU ASK A NURSE FOR ANY HELP?" IF NO, CODE NA. IF YES, "WHAT WAS DONE FOR YOU TO RELIEVE THE PAIN?")

DOES THE PATIENT RECEIVE PAIN MEDICATION PROMPTLY AFTER REQUESTING IT, OR AN EXPLANATION AS TO WHY PAIN MEDICATION CANNOT BE GIVEN PROMPTLY? (TO PATIENT: "TODAY DID YOU USUALLY RECEIVE PAIN MEDICATION WITHIN 15 MINUTES AFTER YOU ASKED FOR IT?" IF THE ANSWER IS NO, ASK THE PATIENT: "DID THE NURSE EXPLAIN WHY THE MEDICATION WAS NOT GIVEN PROMPTLY?")

IS THE PATIENT FREE OF DISTURBING NOISE FROM THE HOSPITAL ENVIRONMENT? (TO PATIENT: "ARE YOU UNDISTURBED BY NOISE FROM HOSPITAL EQUIPMENT OR FROM PEOPLE TALKING IN THE CORRIDORS?" DOES NOT REFER TO NOISE EXTERNAL TO HOSPITAL, SUCH AS STREET NOISE. IF PATIENT UNDISTURBED BY HOSPITAL NOISES, CODE YES.)

IS THE PATIENT'S CALL LIGHT ANSWERED PROMPTLY? (TO PATIENT: "WHEN YOU CALLED FOR ASSISTANCE, DID SOMEONE ANSWER YOUR CALL WITHIN 5 MINUTES?" NA ONLY IF PATIENT IN ROOM WITHOUT CALL LIGHT OR IF PATIENT HAS NOT CALLED FOR NURSE IN PAST 2 DAYS.)

IS THE MALE PATIENT SHAVED EACH DAY? (TO PATIENT: "DID SOMEONE SHAVE YOU TODAY OR HELP YOU TO SHAVE YOURSELF TODAY?" "DID YOU DESIRE TO BE SHAVED TODAY?")

IS THE PATIENT IN AN APPROPRIATE POSITION FOR MEALS OR TUBE FEEDINGS? (TO PATIENT: "WHAT POSITION WERE YOU IN FOR YOUR LAST MEAL OR TUBE FEEDING?" OBSERVER MUST DETERMINE IF POSITION WAS APPROPRIATE FOR PATIENT'S CONDITION.)

ARE THE HALLS AND PATIENT ROOMS (OR NURSERY) QUIET AND FREE OF BOISTEROUS BEHAVIOR?

THE NEED FOR PHYSICAL HYGIENE IS ATTENDED

ARE THE PATIENT'S NAILS CLEAN?

ARE THE PATIENT'S HANDS WASHED BEFORE MEALS? (TO PATIENT: "DID SOMEONE ASSIST YOU TO WASH YOUR HANDS OR WERE YOU ABLE TO WASH YOURSELF BEFORE YOUR MEALS?")

IS EQUIPMENT EASILY AVAILABLE FOR BATHING? (CHECK TO SEE THAT TOWELS, WASHCLOTH, BASIN, AND SOAP ARE EASILY AVAILABLE.)

IS ADEQUATE EQUIPMENT FOR ORAL HYGIENE AVAILABLE? (CHECK TO SEE THAT ALL NECESSARY EQUIPMENT IS PRESENT: TOOTHBRUSH, TOOTHPASTE AND MOUTHWASH OR SWAB, SOLUTION, AND DENTURE CUP IF INDICATED.)

ARE THE BEDPAN AND/OR URINAL CLEAN AND STORED IN BEDSIDE TABLE OR BATHROOM? (CODE NO IF PLACED ON OVERBED TABLE, ON FLOOR, ON WINDOWSILL, ETC. MUST BE BOTH CLEAN AND STORED FOR YES ANSWER.)

THE NEED FOR A SUPPLY OF OXYGEN IS ATTENDED

IS THE PATIENT IN A POSITION FOR MAXIMAL LUNG EXPANSION? (OBSERVE ELEVATION OF BED, USE OF PILLOWS, AND POSITION OF HEAD, NECK, AND CHEST. ANSWER YES ONLY IF ALL INDICATORS GOOD.)

DOES THE PATIENT TAKE DEEP BREATHS AFTER SUCTIONING, OR IF PATIENT IS UNCONSCIOUS, DOES NURSE AMBU PATIENT AFTER SUCTIONING?
(TO NURSE: "DOES MR. X TAKE DEEP BREATHS AFTER BEING SUCTIONED?" OR, IF PATIENT IS UNCONSCIOUS: "DO YOU AMBU AFTER SUCTIONING?" CODE NA ONLY IF PATIENT IS NOT SUCTIONED.)

IS THE PATIENT SUCTIONED CORRECTLY?
(OBSERVE SUCTIONING TECHNIQUE. CHECK FOR ROTATION OF CATHETER, INTERMITTENT USE OF SUCTION, PROPER DEPTH OF CATHETER INSERTION, AND SLOW INSERTION AND REMOVAL OF CATHETER. IF ANY PART NOT CORRECT CODE NO.)

IS THE TRACHEOSTOMY SUCTIONED WHEN NEEDED?
(OBSERVE PATIENT FOR AIRWAY PATENCY. CHECK RECORDS TO SEE WHEN TRACH WAS LAST SUCTIONED. MAKE INFERENCE AS TO WHETHER FREQUENCY OF SUCTIONING IS ADEQUATE. ASK NURSE WHEN PATIENT WAS LAST SUCTIONED.)

IS EQUIPMENT NECESSARY FOR MAINTAINING A CLEAR AIRWAY AT THE BEDSIDE?
(E.G., AMBU, AIRWAY, SUCTION EQUIPMENT, TONGUE BLADE, ETC. DOES NOT APPLY TO TURNING OR USE OF HUMIDIFICATION.)

IS EQUIPMENT FOR SUPPLYING SUPPLEMENTARY OXYGEN AND/OR HUMIDIFICATION PROPERLY USED?

(CHECK OXYGEN FLOW RATE, TUBING, POSITION OF FACE MASK OR OTHER MEANS OF GIVING OXYGEN, ALL EQUIPMENT AND CONNECTIONS. IF ANY PART NOT RIGHT, ANSWER NO. EQUIPMENT FOR HUMIDIFICATION APPLIES TO ANY KIND OF HUMIDIFICATION, E.G., TRACH, O₂, AEROSOLS, ISOLETTES, ETC. CHECK PRESENCE OF WATER, ALL TUBING AND CONNECTIONS. IF ANY PART NOT RIGHT, CODE NO. IF PATIENT HAS BOTH OXYGEN AND HUMIDIFICATION, ALL PARTS MUST BE RIGHT FOR YES ANSWER.)

IS THE PATIENT OUT OF BED THE NUMBER OF TIMES ORDERED?
(MAY BE NA ONLY FOR PATIENTS UP AD LIB, PATIENTS ON BEDREST, OR INFANTS AND SMALL CHILDREN.)

THE NEED FOR ACTIVITY IS ATTENDED

IS THE PATIENT ASSISTED WITH ADL (EATING, TOILET, DRESSING, WALKING, ETC.) AS NEEDED?
(TO PATIENT: "WHEN YOU NEED SOME HELP IN YOUR DAILY ACTIVITIES, SUCH AS BATHING OR DOING THINGS FOR YOURSELF, DOES SOMEONE ASSIST YOU WITHIN A REASONABLE AMOUNT OF TIME?" NEEDED AND REASONABLE AMOUNT OF TIME AS DEFINED BY PATIENT.)

IF THE PATIENT SHOULD HAVE RANGE-OF-MOTION EXERCISES PERFORMED, EITHER ACTIVE OR PASSIVE, ARE THEY DONE?
(IF NO MEDICAL OR NURSING ORDERS FOR EXERCISES WRITTEN, OBSERVER MUST DETERMINE WHETHER EXERCISES SHOULD BE DONE. CODE NA IF PATIENT DOES NOT NEED EXERCISES. MAY INCLUDE LEG EXERCISES IN THE IMMEDIATE POSTOPERATIVE PERIOD.)

THE NEED FOR NUTRITION AND FLUID BALANCE IS ATTENDED

ARE NURSING PERSONNEL ACCESSIBLE TO PATIENT DURING MEALS?
(TO PATIENT: "IF YOU NEEDED OR REQUESTED SOME HELP WITH YOUR MEAL TRAY, WAS THERE SOMEONE FROM THE NURSING STAFF TO HELP YOU WITHIN A REASONABLE AMOUNT OF TIME?" PATIENT DEFINES REASONABLE AMOUNT OF TIME.)

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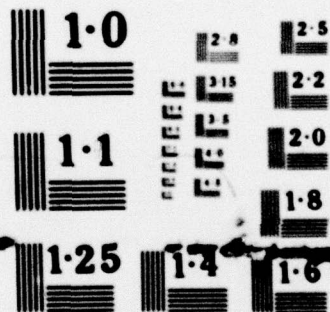
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NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

ARE BOTTLES FOR INTRAVENOUS THERAPY LABELED WITH: PATIENT'S NAME.

ARE BOTTLES FOR IV THERAPY LABELED WITH KIND OF SOLUTION?

ARE BOTTLES FOR IV THERAPY LABELED WITH NAME AND AMOUNT OF ADDITIVES?

ARE BOTTLES FOR IV THERAPY LABELED WITH DATE AND TIME?

ARE BOTTLES FOR IV THERAPY LABELED WITH RATE OF FLOW, IN DROPS OR ON TIME SCHEDULE LABEL?

ARE BOTTLES FOR IV THERAPY LABELED WITH BOTTLE NUMBER?

IS IV FLUID INFUSING AT PRESCRIBED RATE?
(GET PRESCRIBED RATE AND CHECK FLOW.)

THE NEED FOR ELIMINATION IS ATTENDED

ARE UNUSUAL BOWEL OR URINARY TRACT PROBLEMS NOTED, E.G., PASSING BLOOD, BURNING, FREQUENCY, INCONTINENCE, ETC.?
(TO DETERMINE IF APPLICABLE, ASK PATIENT: "HAVE YOU NOTICED ANY UNUSUAL PROBLEMS WITH YOUR BOWELS OR ON URINATION?" DOES NOT REFER TO DAILY RECORDING OF BOWEL MOVEMENT OR TO AMOUNT OF URINARY OUTPUT UNUSUAL PROBLEMS ARE THOSE DEFINED AS SUCH BY EITHER THE OBSERVER OR THE PATIENT. REFERS TO ALL PATIENTS, INCLUDING THOSE WITH A URINARY CATHETER OR COLOSTOMY.)

DOES THE NURSING STAFF ASSIST THE PATIENT TO THE BATHROOM OR WITH BEDPAN/URINAL WITHIN A REASONABLE AMOUNT OF TIME WHEN REQUESTED?
(TO PATIENT: "HAVE YOU REQUESTED ASSISTANCE IN GOING TO THE BATHROOM (OR WITH THE BEDPAN/URINAL) TODAY? DID THE NURSING STAFF GIVE YOU THE ASSISTANCE YOU NEEDED WITHIN A REASONABLE AMOUNT OF TIME?" PATIENT DEFINES REASONABLE AMOUNT OF TIME. CODE YES ONLY IF HELP NEEDED AND GIVEN WITHIN REASONABLE TIME.)

THE NEED FOR SKIN CARE IS ATTENDED

IS THERE A WRITTEN STATEMENT OF THE CARE GIVEN TO PRESSURE AREAS ON THE SKIN?
(REFERS TO DIRECT CARE OF SKIN PROVIDED TO PREVENT SKIN BREAKDOWN SUCH AS MASSAGE. DOES NOT REFER TO TURNING OR TO SPECIFIC CARE GIVEN FOR DECUBITUS.)

IS THE CONDITION OF THE SKIN AROUND THE IV SITE RECORDED?
(E.G., REDDENED, SWOLLEN, COMPLAINT OF ITCHING OR PAIN, INFILTRATION.)

ARE THE UNDERSHEETS CLEAN, DRY, AND SMOOTH?
(APPLIES ONLY TO BEDFAST PATIENTS. CODE NA FOR USE OF HIGH HUMIDITY.)

IS CARE GIVEN TO AREAS OF SKIN BREAKDOWN AS OFTEN AS REQUIRED?
(APPLICABLE TO ANY AREAS OF BREAKDOWN, SUCH AS DECUBITUS, LACERATION, DIAPER RASH, OR SHEET BURN. INCLUDES CARE OF SKIN AROUND OSTOMIES. CHECK TO SEE IF SPECIAL CARE IS NEEDED AND WHETHER PLAN INDICATES SCHEDULE FOR GIVING SUCH CARE. IF CARE SHOULD BE GIVEN AND IS NOT, RECORD NO. IF CARE IS SCHEDULED, NOTE WHETHER RECORDS INDICATE CARE IS DONE AS OFTEN AS SCHEDULED. IF NOT, RECORD NO.)

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THE PATIENT IS PROTECTED FROM INFECTION

DOES THE PATIENT DO DEEP-BREATHING EXERCISES AT SCHEDULED INTERVALS? (CHECK RECORDS TO DETERMINE IF DEEP-BREATHING EXERCISES SHOULD BE DONE AND AT WHAT INTERVALS. IF NO PLAN FOR DOING DEEP-BREATHING EXERCISES, OBSERVER SHOULD DETERMINE WHETHER THEY SHOULD BE DONE, E.G., IF PATIENT IS BEDFAST, IS IN THE IMMEDIATE POSTOPERATIVE PERIOD, HAS A RESPIRATORY INFECTION, ETC. TO NURSE: "DOES MR. X DO HIS DEEP-BREATHING EXERCISES? HOW OFTEN DOES HE DO THEM?" IF EXERCISES SHOULD BE DONE AND ARE NOT, RECORD NO.)

IS THE PATIENT TURNED AS OFTEN AS HE SHOULD BE TURNED? (TO NURSE: "HOW OFTEN IS MR. X TURNED?" CHECK RECORDS TO DETERMINE IF PATIENT SHOULD BE TURNED AND WHEN. IF NO PLAN FOR TURNING, OBSERVER SHOULD DETERMINE WHETHER PATIENT SHOULD BE TURNED, E.G., IF PATIENT IS BEDFAST, CANNOT TURN SELF, IMMEDIATE POSTOPERATIVE, ETC. IF PATIENT SHOULD BE TURNED AND IS NOT, RECORD NO.)

DO THE NURSING STAFF GIVE OR ASSIST THE PATIENT WHO IS NPO WITH MOUTH CARE? (APPLIES TO PATIENT WHO IS NPO FOR AT LEAST 24 HOURS. NA FOR SHORT SPECIFIC NPO PERIOD, E.G., PREDIAGNOSTIC/PRESURGICAL. TO NURSE: "HOW OFTEN DO YOU GIVE MOUTH CARE TO MR. X?" CODE YES IF DONE ONCE ON EACH SHIFT FOR LAST 2 SHIFTS.)

IF THE PATIENT HAS A TRACHEOSTOMY: ARE THE TRACHEOSTOMY TUBES CLEAN? (OBSERVE FOR PRESENCE OF MUCUS OR BLOOD ON TUBES.)

IF THE PATIENT HAS A TRACHEOSTOMY: ARE MATERIALS AROUND THE TRACH TUBE CLEAN AND PROPERLY IN PLACE? (E.G., NECK STRIP AND GAUZE, SECURELY ATTACHED, PLAIN GAUZE RATHER THAN FILLED. NO ACCUMULATED DRIED MUCUS OR BLOOD ON SKIN, GAUZE, AND NECK STRIP.)

IF THE PATIENT HAS A TRACHEOSTOMY: ARE GLOVES WORN TO SUCTION TRACHS? (TO NURSE: "WHEN SUCTIONING MR. X, DID YOU ALWAYS WEAR GLOVES?" CODE NO IF NOT ALWAYS DONE.)

DOES THE RECORD INDICATE THAT PERINEAL/MEATUS CARE HAS BEEN GIVEN AT LEAST ONCE THIS SHIFT TO PATIENTS WITH INDWELLING CATHETERS?

IS ASEPTIC TECHNIQUE CARRIED OUT AS NECESSARY IN PREPARING OR GIVING INJECTIONS, TREATMENTS, OR SPECIAL PROCEDURES, E.G. CATHETERIZATION, DRESSING CHANGES, WOUND CARE, ETC.? (MAY OBSERVE ANY OF ABOVE ITEMS TO ANSWER QUESTION.)

IS THE URINARY CATHETER DRAINAGE SYSTEM CLOSED? (REFERS TO DRAINAGE SYSTEM BEING USED. THERE SHOULD BE NO OPENING THROUGH WHICH DUST PARTICLES CAN ENTER SYSTEM. CHECK ALL CONNECTION POINTS, ESPECIALLY WHERE TUBING IS ATTACHED TO BAG.)

ARE THE DRAINAGE TUBING AND BAG PATENT, PROPERLY CONNECTED, AND POSITIONED FOR MAXIMAL DRAINAGE AND PREVENTION OF STASIS? (APPLIES TO URINARY OR OTHER TUBES. ACCEPTABLE ONLY IF ALL OF CATHETER AND TUBING PLACED FOR CONTINUOUS DOWNWARD DRAINAGE, NOT ACCEPTABLE IF CATHETER OR TUBING LOOPED OR SLANTED UPWARD AT ANY POINT. ALL PARTS MUST BE RIGHT FOR YES ANSWER. MAY BE NA IN UNUSUAL CASES, SUCH AS TUR OR BLADDER RETRAINING OR WHEN MEDICAL OR NURSING ORDERS SPECIFY OTHER THAN STRAIGHT GRAVITY DRAINAGE.)

DO THE EQUIPMENT AND SOLUTIONS FOR SUCTIONING AND IRRIGATION MEET REQUIREMENTS FOR ASEPSIS?
(E.G., STERILE FOR URINARY CATHETERS, CLEAN FOR G.I. TUBES.
FOR TRACH CARE, EQUIPMENT AND SOLUTIONS MUST EITHER BE STERILE OR MUST BE CHANGED AT LEAST EVERY 4 HOURS. UNACCEPTABLE IF ANY SOLUTIONS KEPT IN UNCOVERED CONTAINER. ALL EQUIPMENT AND SOLUTIONS MUST MEET THESE STANDARDS FOR YES ANSWERS.)

IS THERE A STATEMENT ABOUT ALLERGIES WRITTEN AT THE TIME OF ADMISSION TO THIS UNIT?
(REFERS TO STATEMENT OF PRESENCE OR ABSENCE OF ALLERGIES.
CODE NA IF INFORMATION RECORDED ON ADMISSION TO ANOTHER UNIT.)

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THE NONPHYSICAL NEEDS (PSYCHOLOGICAL, EMOTIONAL, MENTAL, SOCIAL, SPIRITUAL) OF THE PATIENT ARE ATTENDED

THE PATIENT IS ORIENTED TO HOSPITAL FACILITIES ON ADMISSION

ON ADMISSION TO THIS UNIT, IS PATIENT INFORMED HOW TO CALL THE NURSE?
(TO PATIENT: "DID SOMEONE TELL YOU HOW TO CALL THE NURSING STAFF OR CHECK TO SEE IF YOU ALREADY KNEW HOW TO CALL?" IF ANSWER IS YES, ASK: "WHEN DID YOU FIND OUT HOW TO CALL SOMEONE?" IF PATIENT WAS NOT INFORMED BY THE NURSING STAFF ON ADMISSION, CODE NO, EVEN IF PATIENT ALREADY KNEW FROM PREVIOUS ADMISSION OR FROM ADMISSION TO ANOTHER UNIT.)

IS THE PATIENT SHOWN NECESSARY FACILITIES, SUCH AS THE LAVATORY AND BATHROOM, ON ADMISSION?
(TO PATIENT: "WHEN YOU WERE ADMITTED TO THIS UNIT, DID SOMEONE SHOW YOU WHERE THE BATHROOM OR PLACE TO WASH YOUR HANDS ARE LOCATED?" CODE NA IF PATIENT INITIALLY ADMITTED TO ANOTHER UNIT OR IF PATIENT WAS NOT UP TO BATHROOM ON ADMISSION.)

ARE SAFETY MEASURES, SUCH AS SMOKING REGULATIONS, OR PRECAUTIONS GETTING IN AND OUT OF BED, EXPLAINED ON ADMISSION TO THE UNIT?
(TO PATIENT: "WHEN YOU ARRIVED ON THIS UNIT, WERE YOU TOLD IF THERE WERE ANY SPECIAL SAFETY MEASURES FOR THIS UNIT, SUCH AS SMOKING REGULATIONS, PRECAUTIONS IN GETTING IN AND OUT OF BED, OR ANY OTHER PRECAUTIONS?" ACCEPTABLE IF SAFETY MEASURES INCLUDED IN PATIENT BROCHURE AND PATIENT WAS REFERRED TO BROCHURE FOR INFORMATION. CODE NA IF PATIENT INITIALLY ADMITTED TO ANOTHER UNIT.)

IS THE PATIENT INFORMED ON ADMISSION OF THE EMERGENCY CALL SYSTEM IN THE BATHROOM?
(APPLIES TO SITUATIONS IN WHICH THE BATHROOM HAS EMERGENCY CALL SYSTEM. TO PATIENT: "WHEN YOU WERE FIRST ADMITTED TO THIS UNIT, DID SOMEONE TELL YOU HOW TO CALL FOR A NURSE IF YOU ARE IN THE BATHROOM?" CODE NA IF PATIENT INITIALLY ADMITTED TO ANOTHER UNIT.)

THE PATIENT IS EXTENDED SOCIAL COURTESY BY THE NURSING STAFF

DO THE NURSING STAFF CALL PATIENT AND FAMILY BY APPROPRIATE NAME?
(TO PATIENT: "WHEN SPEAKING TO YOU OR YOUR FAMILY TODAY, HAVE THE NURSING STAFF CALLED YOU BY THE APPROPRIATE NAME?")

DO NURSING STAFF MEMBERS INTRODUCE THEMSELVES TO THE PATIENT?
(TO PATIENT: "DO NEW MEMBERS OF THE NURSING STAFF INTRODUCE THEMSELVES TO YOU?")

ARE NURSING PERSONNEL ON DUTY NOW COURTEOUS TO PATIENT AND HIS FAMILY?
(TO PATIENT: "ARE THE NURSES SATISFACTORILY COURTEOUS TO YOU AND YOUR FAMILY?")

DO STAFF ELICIT PATIENT'S PARTICIPATION DURING ROUNDS?
(TO PATIENT: "TODAY HAVE ANY GROUPS OF STAFF, SUCH AS DOCTORS AND NURSES MAKING ROUNDS, COME INTO YOUR ROOM?" IF YES, "DID YOU FEEL THAT THEY ADEQUATELY INCLUDED YOU IN THEIR DISCUSSIONS AND GAVE YOU A CHANCE TO ASK QUESTIONS?")

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THE PATIENT'S PRIVACY AND CIVIL RIGHTS ARE HONORED

IS THE NURSE AWARE OF WHAT THE PATIENT HAS BEEN TOLD ABOUT HIS CONDITION? (TO NURSE: "DO YOU KNOW WHAT MR. X HAS BEEN TOLD ABOUT HIS ILLNESS?" CODE NO IF NURSE IS UNSURE OR DOES NOT KNOW.)

DO THE NURSING STAFF INFORM THE PATIENT OF THE PLAN FOR DAILY CARE OF THE PATIENT?

(TO PATIENT: "AT THE BEGINNING OF THE DAY, DID THE NURSE TELL YOU WHAT YOUR ACTIVITIES FOR THE DAY WOULD BE?")

ARE SPECIAL PROCEDURES AND STUDIES EXPLAINED TO THE PATIENT?

(TO PATIENT: "HAVE YOU HAD ANY SPECIAL TESTS OR PROCEDURES TODAY? WERE THEY EXPLAINED TO YOU BEFORE THEY WERE DONE?"

DOES NOT REFER TO ROUTINE TREATMENTS. CODE NA IF PATIENT HAD NO TESTS OR SPECIAL PROCEDURES. MAY RECORD NA FOR INFANTS.)

ARE CURTAINS DRAWN OR DOOR CLOSED FOR EXAMINATIONS, TREATMENTS, OR PRIVACY?

(TO PATIENT: "WHEN YOU HAVE HAD AN EXAMINATION OR TREATMENT OR WHEN YOU JUST WANTED PRIVACY, WERE THE CURTAINS DRAWN AROUND YOUR BED OR THE DOOR CLOSED?")

DO NURSING STAFF DISCUSS THE PATIENT AND HIS CARE EITHER WITH THE PATIENT, AS IN NURSING ROUNDS OR IN PRIVATE PLACES ON THE UNIT WHERE OTHER PATIENTS OR VISITORS CANNOT HEAR THE DISCUSSION? (PRIVATE PLACE MAY REFER TO STATION, CONFERENCE AREAS ON UNIT, ETC.) CODE NO IF DISCUSSIONS ARE HELD WHERE VISITORS OR OTHER PATIENTS CAN HEAR THEM.

DO NURSING STAFF DISCUSS THEIR PERSONAL PROBLEMS IN PRIVATE, NOT WITH OR IN THE PRESENCE OF PATIENTS?

(TO PATIENT: "HAVE ANY OF THE NURSING STAFF DISCUSSED THEIR PERSONAL PROBLEMS WITH YOU OR IN YOUR PRESENCE?" IF PATIENT REPORTS THAT STAFF DO DISCUSS PERSONAL PROBLEMS IN HIS PRESENCE, RECORD NO.)

THE NEED FOR PSYCHOLOGICAL-EMOTIONAL WELL-BEING IS ATTENDED

DO THE NURSING STAFF INFORM THE PATIENTS ABOUT ACTIVITIES BEFORE THEY ARE CARRIED OUT?

(REFERS TO ROUTINE CARE ACTIVITIES; DOES NOT REFER TO OBTAINING CONSENT FOR SPECIAL PROCEDURES. INFORMATION MAY BE MINIMAL ABOUT WHAT NURSE IS GOING TO DO. DOES NOT NEED TO BE EXTENSIVE EXPLANATION. TO PATIENT: "DO THE NURSES TELL YOU WHAT THEY ARE GOING TO DO BEFORE THEY CARRY OUT SOME ACTIVITY SUCH AS BATHS, INJECTIONS, DRESSING CHANGES, ETC.?" IF CANNOT INTERVIEW SEVERELY ILL PATIENTS, TRY TO GET INFORMATION BY OBSERVING NURSES WITH PATIENTS.)

IS VERBAL COMMUNICATION DIRECTED TOWARD THE SEVERELY ILL OR UNCONSCIOUS PATIENT OR TOWARD INFANTS?

(OBSERVE NURSING STAFF WITH PATIENT TO SEE WHETHER THEY TALK TO PATIENT.)

IS THERE TACTILE COMMUNICATION WITH THE SEVERELY ILL OR UNCONSCIOUS PATIENT OR WITH INFANTS?

(OBSERVE NURSING STAFF WITH PATIENT TO DETERMINE WHETHER SENSE

OF TOUCH IS USED AS MEANS OF COMMUNICATION, E.G., USE OF TOUCH IN COMFORTING WAY, ASIDE FROM PROVIDING TECHNICAL CARE.)

DO NURSES LISTEN TO THE PATIENT?

(TO PATIENT: "WHEN YOU ASK QUESTIONS OR MAKE COMMENTS, DO YOU FEEL THAT THE NURSES LISTEN TO YOU AND SHOW AN INTEREST IN WHAT YOU SAY?")

THE PATIENT'S FAMILY IS INCLUDED IN THE NURSING CARE PROCESS

IS A DESCRIPTION OF CARE GIVEN BY THE FAMILY RECORDED?

(ASK PATIENT, TO DETERMINE IF APPLICABLE: "DID YOUR FAMILY AND/OR FRIENDS VISIT YOU IN THE HOSPITAL TODAY? ARE THERE ANY SPECIFIC THINGS THEY DID FOR YOU WHILE THEY WERE HERE? WHAT DID THEY DO?")

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ACHIEVEMENT OF NURSING CARE OBJECTIVES IS EVALUATED

RECORDS DOCUMENT THE CARE PROVIDED FOR THE PATIENT

DO RECORDS DOCUMENT ALL TREATMENTS CURRENTLY BEING PERFORMED? (ALL WRITTEN PRESCRIBED TREATMENTS, EITHER BY MEDICINE OR BY NURSING, E.G., DRESSING, IRRIGATION, IPPB, ETC.)

DO RECORDS DOCUMENT THE VITAL SIGNS AND BLOOD PRESSURE AS INDICATED IN MEDICAL OR NURSING ORDERS?

DO RECORDS DOCUMENT THE REASONS FOR OMISSION OF MEDICATIONS?

DO RECORDS DOCUMENT THE REASON FOR ADMINISTRATION OF PRN MEDICATIONS?

DO RECORDS DOCUMENT THE EFFECT OF PRN MEDICATION?

DO RECORDS DOCUMENT THE TIME OF ADMINISTRATION OF MEDICATIONS ON THIS UNIT?

DO RECORDS DOCUMENT ROUTE OF ADMINISTRATION OF MEDICATIONS?

DO RECORDS DOCUMENT SITE OF INJECTION OF MEDICATIONS?

DO RECORDS DOCUMENT NAME OF PERSON WHO GAVE MEDICATION?

DO RECORDS DOCUMENT DOSAGE OF MEDICATIONS GIVEN?

THE PATIENT'S RESPONSE TO THERAPY IS EVALUATED

ARE OBSERVATIONS RELATED TO MEDICAL TREATMENT, MEDICATIONS, DISEASE PROCESS, OR POSSIBLE COMPLICATIONS NOTED, E.G., CHANGES IN CONDITION, OBSERVATIONS TO DETECT ONSET OF COMPLICATIONS? (STATEMENT OF OBSERVATIONS MAY REFER TO EITHER PRESENCE OR ABSENCE OF PROBLEMS. INCLUDES ANY NURSING OBSERVATIONS NOT INCLUDED IN MEDICAL ORDERS. INCLUDES SIDE OR UNTOWARD EFFECTS OF CURRENT THERAPY. CONSIDER CONDITION OF PATIENT AND DETERMINE WHETHER SPECIFIC OBSERVATIONS SHOULD BE MADE. IF NOT RECORDED, ANSWER NO.

IS THE PATIENT'S PERFORMANCE OF SELF-CARE ACTIVITIES, E.G., EATING, TOILET, WALKING, DRESSING, DOING OWN TREATMENTS, ETC., RECORDED?

UNIT PROCEDURES ARE FOLLOWED FOR THE PROTECTION OF ALL PATIENTS

ISOLATION AND DECONTAMINATION PROCEDURES ARE FOLLOWED

WHEN A PATIENT IS ISOLATED: DO THE NURSING STAFF FOLLOW THE ISOLATION PROCEDURE SPECIFIED FOR THE ISOLATED PATIENT?

WHEN A PATIENT IS ISOLATED: IS CONTAMINATED LINEN, EQUIPMENT, AND WASTE REMOVED FROM ISOLATION ROOMS ACCORDING TO HOSPITAL POLICY?

WHEN A PATIENT IS ISOLATED: ARE ISOLATION PRECAUTIONS (I.E., A SIGN TO INDICATE WHAT TO WEAR: GLOVES, GOWN, MASK) POSTED OUTSIDE THE PATIENT'S DOOR?

WHEN A PATIENT IS ISOLATED: ARE NECESSARY SUPPLIES (E.G., GOWN, GLOVES, MASK) IMMEDIATELY ACCESSIBLE, FOR EXAMPLE OUTSIDE THE DOOR OF THE ISOLATED PATIENT'S ROOM OR INSIDE THE NURSERY?

WHEN A PATIENT IS ISOLATED: DO NONNURSING PERSONNEL OBSERVE THE ISOLATION PROCEDURE SPECIFIED OUTSIDE THE PATIENT'S DOOR?
(IF PROCEDURE IS NOT ALWAYS FOLLOWED, RECORD NO. REFERS TO ALL NONNURSING PERSONNEL.)

IS THE PROCEDURE FOR DISPOSAL OF DIRTY/USED SUPPLIES AND EQUIPMENT FOLLOWED?
(DOES NOT REFER TO ISOLATION PROCEDURE. SEE HOSPITAL PROCEDURE.)

ARE PRECAUTIONS TAKEN BY NURSING STAFF TO PROTECT PATIENTS FROM KNOWN RESPIRATORY INFECTIONS AND OTHER COMMUNICABLE DISEASES?
(TO NURSE IN CHARGE: "TODAY, HAS THERE BEEN ANY INCIDENCE OF OTHER COMMUNICABLE DISEASES ON THIS UNIT?" IF YES: "WAS ANYTHING DONE TO PREVENT THE SPREAD OF INFECTION, SUCH AS PUTTING PATIENTS IN PRIVATE ROOMS OR REQUIRING STAFF WITH RESPIRATORY CONDITIONS TO STAY AT HOME?" CODE YES, ONLY IF NURSE STATES SPECIFIC PRECAUTIONS THAT WERE TAKEN.)

DO THE STAFF WASH THEIR HANDS BETWEEN PATIENTS?
(SHOULD BE DONE AFTER ANY DIRECT CARE WITH DIRECT CONTACT OF NURSE WITH BODY OR LINENS OF THE PATIENT. IF NOT ALWAYS DONE, RECORD NO.)
(DOES NOT REFER TO ISOLATION PROCEDURE. SEE HOSPITAL PROCEDURE.)

THE UNIT IS PREPARED FOR EMERGENCY SITUATIONS

IS THE EMERGENCY CART CHECKED DAILY FOR ADEQUACY OF SUPPLIES?
(TO NURSE: "DO YOU KNOW IF THE EMERGENCY CART WAS CHECKED?"
NOT NECESSARY TO ASK NURSE, IF RECORD USED TO INDICATE THAT CART HAS BEEN CHECKED.)

**THE DELIVERY OF NURSING CARE IS FACILITATED BY ADMINISTRATIVE AND
MANAGERIAL SERVICES**

NURSING REPORTING FOLLOWS PRESCRIBED STANDARDS

**ARE NURSING NOTES WRITTEN ABOUT THE PATIENT AS REQUIRED BY
HOSPITAL POLICY?**

ARE ALL NURSING NOTES, WRITTEN THIS SHIFT, LEGIBLE?

**ARE NURSING NOTES, WRITTEN THIS SHIFT, PROPERLY SIGNED AS
REQUIRED BY HOSPITAL POLICY?**

**IF ABBREVIATIONS ARE USED IN THE NURSING NOTES, WRITTEN THIS SHIFT,
ARE THEY ACCEPTABLE ACCORDING TO HOSPITAL POLICY?**

NURSING MANAGEMENT IS PROVIDED

**IS A REGISTERED NURSE IN CHARGE AND PRESENT ON THE UNIT THIS SHIFT?
(YES MEANS RN ON THE UNIT. NOT ACCEPTABLE TO HAVE SAME RN COVER
MORE THAN ONE UNIT. CHECK STAFFING ROSTER OR BY OBSERVATION.)**

**DOES THE NURSE IN CHARGE DELEGATE TASKS ACCORDING TO BOTH PATIENT
NEEDS AND LEVEL OF SKILL OF PERSONNEL?
(TO NURSE: "HOW DID YOU DECIDE WHICH ACTIVITIES TO ASSIGN TO OTHER
MEMBERS OF THE NURSING STAFF AND WHICH ONES TO PERFORM YOURSELF?"
ANSWER NO, IF TASKS OR PATIENTS ASSIGNED ACCORDING TO NUMBERS OF
PERSONNEL. ANSWER YES, IF ASSIGNMENT MADE IN CONSIDERATION OF BOTH
DIFFERENT LEVELS OF SKILL OF STAFF AND SEVERITY OF PATIENTS. MAY BE NA
ONLY IN PRIMARY OR MODULAR SETTING IN WHICH NURSE WORKS ALONE.)**

**DOES THE NURSE IN CHARGE SEE THE PATIENT AT LEAST TWICE DURING THE
SHIFT? (TO NURSE IN CHARGE: "HOW MANY TIMES WOULD YOU SAY YOU ARE
ABLE TO SEE MR. X DURING THE SHIFT?" NURSE IN CHARGE REFERS TO PRIMARY
NURSE, TEAM LEADER, CHARGE NURSE, OR EQUIVALENT.)**

**DOES THE NURSE IN CHARGE CHECK TO SEE THAT DELEGATED TASKS HAVE
BEEN PERFORMED?
(TO NURSE IN CHARGE: "HOW DO YOU FIND OUT WHETHER THE WORK YOU HAD
ASSIGNED TO OTHER PERSONNEL HAD BEEN CARRIED OUT?" RECORD YES, ONLY
IF NURSE REPORTS DIRECT PERSONAL OBSERVATION FOR EVIDENCE THAT ALL
SPECIFIC TASKS WERE PERFORMED. NOT NECESSARY TO HAVE OBSERVED ACTUAL
PERFORMANCE. NURSE IN CHARGE REFERS TO TEAM LEADER, CHARGE NURSE, OR
EQUIVALENT.)**

**DOES THE HEAD NURSE OR EQUIVALENT IN CHARGE OF THE UNIT MAKE
ROUNDS ON ALL PATIENTS ON THE UNIT?
(TO HEAD NURSE OR EQUIVALENT: "DID YOU MAKE WALKING ROUNDS ON ALL
PATIENTS ON THIS UNIT?")**

**ARE PATIENT CONFERENCES CONDUCTED TO PLAN AND COORDINATE A
SPECIFIC PATIENT'S CARE?
(TO NURSE IN CHARGE: "IN THE PAST WEEK, HAVE YOU HAD ANY
PATIENT CARE CONFERENCES?" PATIENT CARE CONFERENCES REFER TO ANY
CONFERENCES HELD ABOUT A SPECIFIC PATIENT FOR THE PURPOSE OF**

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PLANNING AND COORDINATING HIS CARE. NOT ACCEPTABLE IF THE ONLY CONFERENCES IN THE PAST WEEK WERE ROUNDS, IN-SERVICE PROGRAMS, OR OTHER MEETINGS NOT RELATED TO A SPECIFIC PATIENT'S CARE.)

CLERICAL SERVICES ARE PROVIDED

ARE ALL PAGES OF THE CHART STAMPED WITH THE ADDRESSOGRAPH CORRECTLY? (FOR YES ANSWER, ALL PAGES MUST BE STAMPED WITH THE CORRECT PATIENT'S ADDRESSOGRAPH PLATE.)

ARE ALL ROUTINE FORMS INCLUDED IN THE PATIENT'S CHART? (CHECK TO SEE THAT ALL ROUTINE PAGES ARE PRESENT.)

ARE TRANSCRIBED MEDICATION AND TREATMENT ORDERS DATED? (FROM KARDEX AND/OR MED CARDS.)

DOES THE CLERK TRANSCRIBE THE PHYSICIAN'S ORDERS? (TO NURSE IN CHARGE: "DID A CLERK TRANSCRIBE THE PHYSICIAN'S ORDERS?")

ARE ORDERS TRANSCRIBED WITHIN ONE HOUR AFTER WRITTEN?

ARE ORDERS REVIEWED DAILY TO ENSURE THAT ALL TRANSCRIPTIONS ARE ACCURATE, CURRENT, AND COMPLETE? (TO NURSE: "DID SOMEONE REVIEW THE ORDERS TO BE SURE TRANSCRIPTIONS ARE COMPLETE? TO CHECK FOR AUTOMATIC EXPIRATION OF MEDICATION ORDERS? TO MAKE SURE THEY WERE TRANSCRIBED CORRECTLY?" IF REVIEW WAS NOT DONE FOR ALL 3, OR ACCORDING TO HOSPITAL POLICY, CODE NO.)

DOES A CLERK ANSWER THE UNIT TELEPHONE? (TO NURSE: "HAVE CLERKS ON DUTY ALWAYS ANSWERED THE PHONE AT THE DESK?" IF NURSES HAVE ANSWERED THE PHONE, CODE NO.)

DOES THE CLERK HANDLE COMMUNICATIONS WITH OTHER DEPARTMENTS UNLESS DIRECT COMMUNICATION BY A NURSE IS REQUIRED? (TO NURSE: "HAS A CLERK TAKEN CARE OF ALL COMMUNICATIONS WITH OTHER DEPARTMENTS UNLESS DIRECT COMMUNICATION BY A NURSE WAS REQUIRED?" ANSWER NO, IF NURSE TOOK CARE OF ANY ROUTINE REQUISITIONS. CODE NA ONLY IF NURSE IS REQUIRED, I.E., IF SPECIFIC NURSING KNOWLEDGE IS NEEDED. DOES NOT REFER TO ANSWERING TELEPHONE.)

ENVIRONMENTAL AND SUPPORT SERVICES ARE PROVIDED

IS THE PATIENT'S ROOM CLEAN? (REFERS TO CLEANLINESS OF FLOOR, BED (ASIDE FROM LINENS), WALLS, MAJOR PIECES OF EQUIPMENT, AND BEDSIDE TABLES. ALL MUST BE CLEAN FOR YES ANSWER. DOES NOT REFER TO TRASH CANS.)

IS THE SINK IN THE PATIENT'S ROOM OR ADJACENT BATHROOM USED BY THE PATIENT CLEAN?

HAS WASTE BEEN REMOVED FROM THE PATIENT'S ROOM? (CHECK FOR EMPTIED TRASH CANS AND FOR CLUTTER IN ROOM. DOES NOT APPLY TO ITEMS LEFT ON PATIENT'S BED.)

IS ALL EQUIPMENT IN THE ROOM BEING USED OR ON A STANDBY BASIS? (REFERS TO ANY TYPE OF EQUIPMENT CURRENTLY USED IN TREATING PATIENTS, E.G., OXYGEN EQUIPMENT, IPPB MACHINE, SUCTION EQUIPMENT, ETC. OR EQUIPMENT ANTICIPATED FOR IMMEDIATE USE BECAUSE OF

PATIENT'S UNSTABLE CONDITION.)

IS ALL EQUIPMENT IN THE ROOM IN ITS PROPER PLACE?
 (REFERS TO ANY TYPE OF EQUIPMENT CURRENTLY USED IN TREATING PATIENTS, E.G., OXYGEN EQUIPMENT, IPPB MACHINE, SUCTION EQUIPMENT, ETC. OR EQUIPMENT ANTICIPATED FOR IMMEDIATE USE BECAUSE OF PATIENT'S UNSTABLE CONDITION.)

IS THE PATIENT'S ROOM FREE OF SMOKE?
 (NOT APPLICABLE ONLY IF PATIENT IS IN PRIVATE ROOM AND IS SMOKING.)

IS THE ROOM TEMPERATURE COMFORTABLE FOR THE PATIENT?
 (TO PATIENT: " IS THE TEMPERATURE IN YOUR ROOM COMFORTABLE FOR YOU NOW?")

IS THE CORRIDOR CLEAR OF ALL EQUIPMENT?
 (OBSERVE FOR STRETCHERS AND MACHINES OR ANY OTHER EQUIPMENT CURRENTLY IN CORRIDOR.)

ARE SUPPLIES FOR HANDWASHING (SOAP, WATER, TOWELS) PRESENT AT THE SINK USED FOR HANDWASHING BY PATIENTS OR STAFF?

DOES THE PHARMACY DELIVER ALL ROUTINE AND STAT SUPPLIES TO THE UNIT?
 (TO NURSE IN CHARGE: "HAVE PHARMACY PERSONNEL DELIVERED ALL ROUTINE AND STAT SUPPLIES TO THE UNIT WITHIN A REASONABLE TIME?"
 CODE YES, ONLY IF SUPPLIES BOTH DELIVERED BY PHARMACY PERSONNEL AND WITHIN A REASONABLE TIME. APPLIES TO ANY DELIVERY SYSTEM, E.G., DUMBWAITER, ETC.)

ARE SUPPLIES FROM CENTRAL SUPPLY DELIVERED TO THE UNIT?
 (TO NURSE: "HAVE CENTRAL SUPPLY PERSONNEL DELIVERED ALL SUPPLIES TO THE UNIT WITHIN A REASONABLE TIME?" CODE YES, ONLY IF SUPPLIES BOTH DELIVERED BY CENTRAL SUPPLY PERSONNEL AND WITHIN A REASONABLE TIME. APPLIES TO ANY DELIVERY SYSTEM, E.G., DUMBWAITER, ETC.)

HAVE HOUSEKEEPING PERSONNEL DONE ALL CLEANING IN CORRIDORS?
 (ASK NURSE IN CHARGE)
 (CODE NO, IF ANY PART DONE BY NURSING PERSONNEL.)

HAVE HOUSEKEEPING PERSONNEL DONE ALL CLEANING IN UTILITY ROOMS?
 (ASK NURSE IN CHARGE.)
 (CODE NO, IF ANY PART DONE BY NURSING PERSONNEL.)

HAVE HOUSEKEEPING PERSONNEL DONE ALL CLEANING OF PATIENT BEDS, ASIDE FROM CHANGING LINENS?
 (ASK NURSE IN CHARGE.)
 (CODE NO, IF ANY PART DONE BY NURSING PERSONNEL.)

HAVE HOUSEKEEPING PERSONNEL DONE ALL CLEANING OF PATIENT UNIT ON DISCHARGE?
 (ASK NURSE IN CHARGE.)
 (CODE NO, IF ANY PART DONE BY NURSING PERSONNEL.)

DOES AN ESCORT SERVICE TAKE PATIENTS TO OTHER AREAS OF THE HOSPITAL UNLESS NURSING SUPERVISION OF THE PATIENT IS REQUIRED?
 (TO NURSE: "HAS AN ESCORT SERVICE TAKEN ALL PATIENTS TO OTHER AREAS OF THE HOSPITAL UNLESS NURSING SUPERVISION OF THE PATIENT WAS REQUIRED?" NURSE IS NECESSARY FOR BABIES. ESCORT SERVICE REFERS TO PERSONNEL WHO ARE SPECIFICALLY RESPONSIBLE FOR TRANSPORTING PATIENTS AND DO NOT HAVE NURSING CARE RESPONSIBILITIES.

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CODE NO, IF ANY NURSING PERSONNEL WHO ARE PROVIDING NURSING CARE ON THE UNIT ARE USED FOR TRANSPORT SERVICE, IF NURSING SUPERVISION OF PATIENT WAS NOT REQUIRED.)

DO SUPPORT SERVICE PERSONNEL, SUCH AS UNIT MANAGER, ADMITTING OFFICE, ETC., EXPLAIN CARE AND USE OF PERSONAL PROPERTY TO THE PATIENT OR FAMILY ON ADMISSION TO THE HOSPITAL?
(TO PATIENT: "WHEN YOU ENTERED THE HOSPITAL, DID SOMEONE TELL YOU WHAT TO DO WITH PERSONAL BELONGINGS, SUCH AS CLOTHES OR JEWELRY? DO YOU RECALL WHO EXPLAINED IT TO YOU?" YES ONLY IF EXPLAINED BY NONNURSING PERSONNEL. CODE NA, IF PATIENT TRANSFERRED FROM ANOTHER UNIT.)

ARE SUPPLIES FROM INHALATION THERAPY DELIVERED TO THE UNIT WITHIN A REASONABLE TIME?

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